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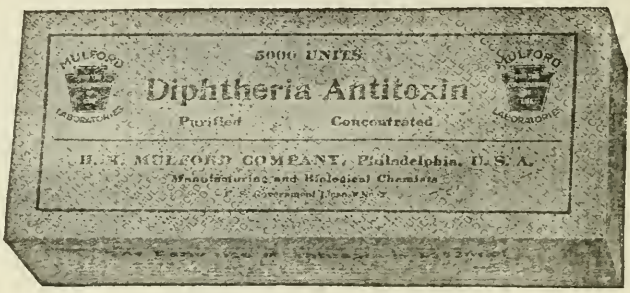

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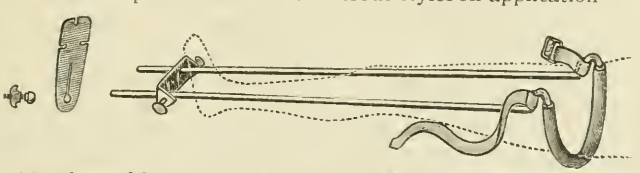

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THE
MILITARY SURGEON

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ORIGINAL ARTICLES

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ABSTRACT OF REPORT OF PROFESSOR RUBNER MADE IN THE REICHGESUNTHEITSRAT, DEC. 20, 1917[1]

THE YEAR with the most important changes in the food-supply was, for the cities, 1916-17, beginning in part with the reduction of the meat ration at Easter, 1916, that of milk in the autumn of 1917, followed by a reduction everywhere of the food-supply in general. As regards quality, the diet for the cities up to Easter of 1916 was to a certain extent like the peace-time diet, the nutritive content of which, as reckoned for the whole nation, was as follows:

Of every 100 calories of nourishment there were:

	Calories		*Calories*
In milk	8.2	In bread	36.9
In Cheese	1.1	In flour	5.5
In eggs	0.8	In sugar	7.9
In meat and sausage	13.0	In potatoes	12.2
In butter	5.8	In vegetables	3.7
In other fats	4.9		

The city and country of course fared differently as regards the composition of the diet, and in several of the larger cities as high as 26 per cent of the calories may have been contained in the meat and 12 per cent in the fat, to offset which the other rations, as for example bread and potatoes, would show lesser amounts.

The diet of the cities, to be regarded in its deviations as a luxurious diet, was far more than sufficient; other forms of work, other life tasks and conditions exercised at least upon the diet an influence that was in many respects very important. Of the most widely used foods there

[1] The above report on conditions in Germany, and written by a German, is interesting as dealing with the question of food in Germany and its place in economics. Professor Rubner is not particularly optimistic in regard to any of the plans for rationing.

So far as we know this is one of the first papers published on this subject and should be of interest as treating a question which commanded international discussion.

The complete report is too long for reproduction *in toto*, but the excerpt covers sufficient to give a clear idea.—THE EDITOR.

gradually fell away an essential part. How little coming events are appreciated is shown by a plan for the winter of 1916-17 published in the summer of 1916 by the Department in Charge of Food Supplies during the War, according to which the following could be regarded as guaranteed per day per person:

	Protein, Gr.	*Total calories*	*Of every 100 calories*
271 gr. bread	17.2	688	34.9
710 gr. potatoes	14.9	710	35.7
18 gr. butter	....	140	7.1
200 c.c. milk	6.8	111	5.5
70 gr. meat	10.7	158	7.9
0.3 eggs	4.2	53	2.6
32 gr. sugar	....	125	6.3
	53.8	1,985	100.0

This quantity was to be the simple individual ration; it was to be possible to obtain, besides this, considerable amounts of unrationed food, perhaps fruit and vegetables, or fish and polished barley. When autumn actually came the diet had become quite different. The ration per person and per day was really:

		Protein, Gr.	*Total calories*	*Of every 100 calories*
271	gr. bread	17.2	688	51.2
357	gr. potatoes	7.5	341	25.4
11.4	gr. margarine and butter	....	89	6.6
36	gr. meat	4.5	78	5.8
0.07	eggs	1.0	13	1.0
26	gr. sugar	....	104	7.7
9.8	gr. polished barley and doughstuffs	0.9	31	....
		31.0	1,344	100.0

Bread and potatoes constituted the bulk of this inadequate diet, and even this ration was not attained always. Polished barley and doughstuffs were delivered to the consumers in varying quantities, and the amount of meat was in many cities only one-third as large as here given. In place of potatoes "*steckruben*" was substituted; instead of 2 kg. of potatoes per week 2.5 kg. of steckruben were given out, and even this proportion was not everywhere maintained, therefore great quantities of steckruben were eaten.

On June 15, 1917, there came a favorable change in conditions, when the potatoes were used up, as now a little bread and meat were distributed as substitutes. In this decreased form of the rations 64.2 per cent of the calories were derived from bread.

It is impossible to balance the ration by unrationed foods as there was and is a shortage in the cities.

On the whole, the entire diet of the nation, in so far as it was not improved by extra allowances, was made really that of the proletariat. Through the exclusion of animal foods it became monotonous and for many no better than the fare of prisoners sixty to seventy years ago.

Garnishings, spices—in short everything that might have served to improve dietetic qualities—were lacking. To an ever-increasing extent steckruben had to serve as food. Soup-like preparations and vegetables, above all, turnips of various kinds, were constantly reappearing. The chief characteristics of such a diet is its high water-content, in which the influence of protein stuffs, which strongly tend to precipitate water, is missing. Because of the lack of real tea and coffee there is lacking a diuretic action, which, in the case of an over-supply of water in the body, is usually very effective. Alimentary polyuria belongs therefore to the common phenomena.

Bread has lost much of its healthy constituency, and its digestibility has greatly diminished during the war. Steckruben belong, even after they have been carefully freed of all woody parts, to food-stuffs that are very hard to digest. They excite the intestines to a copious flow of digestive juices, hence there is a tendency to soft increment. The digestible qualities of the dried preparations, which in part were very carelessly prepared, is worse than that of good, fresh turnips.

Vegetables take up such an immense volume that even with the most splendid digestive organs one can not possible live on them alone. The diet available for the city dweller is a mixture that even in the case of the young and healthy must be counted among the foods that are hard to digest. As only that which is digested is of any account to the body, the present loss of digestible qualities in food means an enormous shortage in the daily ration. Furthermore, the distention of the intestines, due to the bulky vegetable diet, makes the nourishment of the body more difficult.

Bread has been adulterated with the ground-up seeds of weeds, hence the possibility of poisonous effects resulting from such seeds must be taken into consideration. Such additional ingredients as powdered spelt-flour, and even wood-flour, sometimes in considerable quantities, have been found in bread. The ingestion of such food-mixtures results in colic, flatulency and painful bowel movements, due to the hardness and dryness of the feces.

All the foregoing considerations show the inadequacy of the city diet, as it has been developed since October, 1916, at least. In its digestive qualities it ranks far below the diet we furnished in prisons before the war.

The more thoroughly we consider today the conditions of national

nourishment in their effects upon the health, the more the conclusion is forced upon us that the blockade ane embargo compel us to get along with our own food-products. The real basis of the injurious effects to be traced lies mainly in the distribution of the food, which works more or less disadvantageously for individual sections of the nation, and certain groups of persons. In the very beginning we mentioned the fact that the distribution as between city and country has turned out to the disadvantage of the city. It was not necessary to change the composition of the diet of the rural districts, and it has in many sections, where it was very poor in meat, become richer in meat because of the establishment of the Imperial Meat Bureau. For further consideration of the subject we must examine the system of distribution, especially in the cities. This distribution of food is conducted in accordance with certain definite assumptions, among which the attempt to achieve a general regulation for the entire empire, and at the same time to procure the greatest uniformity of distribution, is hard to reconcile. The first system of rationing to be adopted, that of bread, was in the beginning absolutely uniform for every individual unit of the population, but soon had to be modified.

It is clear that the very principle of economy itself is violated by any system of rationing, and that such a system in and of itself, if it is made as "simple" as possible, comes into conflict with the attempt to supply a population with proper nourishment. Before this time, of course, we were acquainted with the rationing of persons of certain classes, as soldiers, prisoners, inmates of institutions, etc., but even in such cases where it was a question of uniform circumstances, similarity of age and occupations, etc., it was impossible to manage the affair without having reserves, extra supplies, and various means of maintaining a proper balance. The present ration, however, attempts to nourish, with little variation, infants, children, pregnant women, nursing mothers, persons working fairly hard, and persons working at the very hardest kind of labor, with an amount uniform for all, and over and above this with the same kind of food, through very limited supplies, given out at short intervals and throughout the entire empire. Any meeting of the real requirements by this simple scheme is impossible, and the result is that many, even if the total amount of the ration to be given out is too small, receive an adequate diet and others an inadequate one. Any evening-up of conditions among individual persons, as found in society, an institution, or in short in every larger association of persons, is limited at best to the family, and if there are but few persons in the family or if it is composed exclusively of adults, the possibility of an evening-up is very slight. Such a nation-wide system

of food distribution, then, as compared with self-regulation, does not lead to economizing, but to a relatively larger using up of supplies. The meagerness of the rations supplied does not permit of any stores on hand, and so the nation lives from hand to mouth, always an uneconomical system. Whatever can be obtained is simply eaten up. This shifting of the food-supply necessitates a comparatively larger expenditure of the food than would be the case with a proper distribution.

The distinction is made between those engaged in munition making and the armament industry and the civilian population. The former are supplied with large amounts of extra rations, more with the idea of keeping them contented than with providing them with a necessary increase of food. The terms "hard worker" and "very hard worker" have been abused, and the wide latitude of interpretation given them has been used for the purpose of securing extra rations. In spite of many exceptions there remains, in the large cities especially, a considerable number of people who really receive only the uniform ration. The classification of callings is wrong, since there are especially in the academic professions a large number of persons who, partly because of actual physical strain, partly through intellectual efforts, partly through long hours of labor, require far more nourishment than is required by many workers in trades and industries.

Foods, especially those not rationed, have soared in price, which many cannot afford; this effects the working classes, who in part enjoy an enormous increase in their incomes, less than it does the government officials as a class and the middle class, who are more and more suffering from suspensions of business, and, being unorganized, have no redress. For many families the fatigue involved in making purchases, the waste of time, and often the physical weakness which makes it impossible to stand around for hours at a time, are all increased difficulties.

The amount of food allowed by a food stamp is a purely mathematical quantity. It is estimated on the average weight of the nation; often those under weight receive too much and those over weight too little nourishment. Families with children have a better chance of making a just distribution than people with only grown-up children or elderly people, who, as usually happens in old age, live alone. On the average a man fares worse than a woman. As the average weight of the nation is about 45 kg., persons weighing 60, 70, or 80 kg. are quite inadequately provided for.

The average person ingests daily food-stuffs containing 91 grams of nitrogen, from which are derived 2,569 calories. After deduction of loss there would be, according to the usual assumptions, about 2,362 calories

and 73 grams of protein. In contrast with these figures, the uniform ration, as given for the winter of 1917, offers 1,344 calories and 30 grams of protein daily.

As to the degree of digestibility of the diet, this depends upon the nature of the food taken in, especially upon the kind of bread eaten, the vegetables and fruit. If a bread containing but little bran is eaten, the digestibility will be considered high. Losses in the diet of well-to-do persons may be kept down as low as 4 per cent; on the average, however, for a mixed diet they will rise as high as 8 per cent. In the war diet the losses have always been larger on account of the preponderance of bread that has not had much waste ground out of it, and vegetables, and on account of the lack of animal nourishment. Such losses amount to about 12 to 15 per cent. The case is just the same as regards the using up of nitrogen. With the mixed diet of peace times it may be as low as 10 per cent, but with the war diet it will increase to as much as 20.40, even 50 per cent loss, according to the kinds of food. The indigestible war diet will, in the case of weak intestines and elderly persons or persons not accustomed to a voluminous diet, lead to greater losses. Therefore, if 1,344 calories are taken in, the diet is for the most part not meeting half the requirements as regards calories and one-third as regards protein; if 1,100 calories are taken in, perhaps four-tenths of the requirements as regards calories, even if one leaves utterly out of consideration the varying degrees of digestibility. Moreover, the number of calories cited was not by any means always attained; because above everything else, in the case of meat, no account is taken of the trimmings. In the case of bread very poor wares were issued, and butter and margarine were astonishingly rich in water-content.

The average weight of persons over twenty-five years of age may be set at 60 kg. Let us assume that the food supply offers on an average 1,000 calories, which in the case of the uniform ration is estimating it rather high on account of the waste in cooking, and we hardly need any further investigation to be assured that every hungry man needs more than 1,000 calories to restore what he loses of his own flesh and fat. From experience gained by experiments we know that a hungry man needs about 30 to 32 calories per kilogram if he stays in his room and moves about no more than is possible and customary under such circumstances, and that a hungry person weighing 60 kg. needs therefore 1,860 calories per day. If you are to give him this amount, he must have about 2,065 calories given in an easily digested diet. In this estimate, however, no account is taken of the nourishment which a human being needs if he is performing the average amount of labor, as assumed in the average of 2,569 calories above cited. The uniform

ration of 1,000 calories, therefore, can by no means claim to meet the real needs, not even if a person were to lie idly in bed. When the diet is insufficient, the human being begins to lose from his body what is lacking in that diet, either fat from his fat-layer or protein. As the cells lose more and more of their content, perhaps both protein and fat are lost.

The human being can, as his body changes, arrive at a lower scale of weight and come to a new permanent condition. There is a limit to this; we know from experiments on animals, old and young, that starvation ensues when a creature that has previously been normally nourished reaches about one-half of its former weight. One can exist on the lowest scale of life if his nourishment is just sufficient to maintain his body reduced to about six-tenths of its former mass. One thousand calories will not suffice in the long run to avert starvation, and the protein in this diet would also be insufficient to prevent death. One thousand calories represent only the needs of a child 2 or 3 years of age.

Statements are frequently made in the press and elsewhere that the peace-time diet was too abundant and that the people are accustoming themselves to smaller quantities of food without any change in the body, and perhaps with an increase in its efficiency. In opposition to these ideas it can be shown that considerable losses of weight have occurred everywhere. The larger quantity of nourishment was therefore no luxury, for it nourished a heavier body. Whether this latter was necessary or not is a question to be settled upon its own merits. However, these observers seem to have paid no attention whatever to the fact that, with somatic changes, functional efficiency has also decreased. Any increase in efficiency is seen only in those who were formerly obese when they have lost the proper amount of weight. The idea of suddenly adapting oneself by "habit" to half one's former diet, without any somatic or functional change, cannot stand inspection. It is, as we see it in its present form, the product of inaccurate observation. The city population have avoided the consequences of the diminution of the rationed diet to 1,000 and 1,300 calories by preventing a part of its effects by legal and illegal additions, and have balanced a part also by the loss of flesh and fat from their own bodies. If, therefore, part of the population have gotten along with the uniform ration, they have succeeded in doing so in spite of the rationing system, because, fortunately, additional supplies in greater or less abundance were procurable.

The first effect of the insufficient diet is, above all, in the case of workers doing muscular work, the lessening of efficiency and changes of functional activity. This is evidenced by the fact that fatigue is felt more quickly than before. If there is shortage of nourishment first

of all, the love of roaming about and of sport is lost; children cease to play; the desire to move about finally sinks so low, if the fatigue persists, that the person avoids, as far as possible, all bodily exertion. How far such effects make themselves felt depends upon the individual's mood; if it is a matter of efforts which must be made for only a certain number of days in order to accomplish a definite result, one overcomes the feeling of fatigue, as does the soldier who advances by magnificent forced marches in anticipation of victory, but this is quite a different matter with the dull, monotonous grind of one's daily trade.

The same is true as regards mental work. When the diet is insufficient, energy and delight in action, initiative, and will grow feeble; the impulses that under other conditions increase the assimilation, and of themselves assist in creating muscular energy, disappear; as the mood because more and more depressed, movements become slow and listless.

Physical decay as the result of under-nourishment manifests itself in the form of loss of fat, which on its side, if carried too far, increases the loss of protein, or from the very beginning in the decrease of protein in the body. If the emaciation has once progressed very far, it is extremely difficult to maintain the balance even with great quantities of protein. This is often shown nowadays in the case of persons worn out and emaciated until they are almost skeletons, and who frequently cannot maintain themselves with 100 grams of protein a day. The most important feature is, of course, the loss of protein, because the cells lose more and more of their content, that is, their efficiency. Yet, if the will is vigorously exerted in the case of persons who are badly run down, we often see them accomplish tasks which under any circumstances would be very fatiguing. Inasmuch as all the organs gradually grow smaller, the muscles grow thin and flabby, the intestines prolapse, the liver, spleen, thyroid gland, kidneys, etc., decrease in size, it is quite comprehensible that the body can no longer be considered healthy; it is undernourished and for the most part very anemic. Associated with anemia is the tendency to sweat if one makes the slightest exertion, and the sensation of cold in a temperature that leaves the normal human being unaffected.

As concerns the sensation of hunger, if a person has a too-abundant fat layer, he can grow thinner and get along indefinitely with less food without the sensation of hunger being permanently heightened. If the weight passes beyond a certain limit, about 10 to 15 per cent, one cannot entirely master the feeling of hunger. It arises at unusual times and long before the ordinary hours for meals, finally becomes real torture, and occupies one's thoughts continually. People complain constantly of hunger and try in all ways to procure more food.

Two other phenomena should be added to this picture. It is a well-

established fact that a one-sided diet containing starchy food leads to an increase of weight through water. This may be observed on a very wide scale in the case of numbers of persons; change in the diet then brings about precipitation of water in the form of urine. Or the phenomena may develop into edema or dropsy, as was observed formerly in prisons. The worn-out body becomes feeble, loses its immunity to many diseases, and has a tendency to succumb to many forms of sickness. In the more favorable mortality statistics of the well-to-do classes in peace time the diet has always been considered to be the most decisive factor.

Experiments and observations of the phenomena now appearing lead us to believe that the body finally, in order to prevent its own ruin, can impose upon itself great limitations in the matter of renewing its organs. This expresses itself in vegetating upon a very low scale of nitrogen-balance, with simultaneous limitations of important functions of the protein, especially limitation of the formation of new blood, of the reconstruction of tissues, or of difficulty in the healing of wounds. In women there is retardation of menstruation and danger of injury to development or of a weakening in the strength of the ovum. In men there is enfeeblement of the testicles and spermatogenesis. The glands atrophy and probably the internal secretions are decreased. The influence of the foregoing on the development of our growing youth must be given particular attention.

These observations and considerations justify the cautious attitude shown by many physiologists from the very beginning in relation to the attempt to reach, as the ideal of national nourishment, an extensive diminution of protein-stuffs in the diet.

In attempting to explain the tremendous disproportion existing between a rationed diet and the real requirements of nourishment for a population, as these requirements existed before the war, the supplies of unrationed food and other additional nourishment which is scattered and impossible to estimate, may be left out of the question. The important question to be answered is whether the general basis upon which the average nourishment requirements have been reckoned has not been changed in the course of the war.

Adaptation to decrease the diet without injury to the health has taken place:

1. Through elimination of the soldiers, by which the average weight of the civilian population has been decreased by about 9 per cent.

2. Through the diminution, arising from the same cause, in the number of vigorous workers with high-nourishment requirements, and the preponderance of the feminine element with lesser efficiency and lesser nourishment requirements.

3. Through the suspension of many industries requiring severe

labor, because of which the workmen had to transfer to other positions, in so far as they were not called to the colors.

We might well estimate the decreases in nourishment arising from these three influences at 1.20 per cent. Then it can be assumed that instead of 2,569 calories we could get along with 2,055 calories per person. In addition, however, we have to consider the injurious effects of the insufficient diet. These effects may be summarized as follows: Decrease in the population, for it can be shown as regards the diet of the very hard workers that the standard ration is not at all sufficient to enable them to accomplish what is demanded in industry in the case of severe labor; restrictions put upon personal activities; the change in city life in general; the prevention of the night life and of the restaurant industry; compulsory unemployment because of lack of illumination (petroleum); the possibility of the sudden liquidation of business houses, etc. Everywhere in a thousand petty details are seen the restrictions put upon work; even the business hours are shortened because of shortage of wares. The growth of the munitions and armament industry has removed these workers from the general food ration system, as they are provided with special rations.

The decrease in the bodily weight causes, through the diminution of the mass to be nourished, a great falling off in the demands made upon the diet.

An average decrease of 10 to 15 per cent in the bodily weight of the city population is certainly a low estimate. If we estimate the decrease in the work because of lack of nourishment as equal to 5 to 10 per cent of the nourishment requirements and again use the lesser estimate, we arrive at the conclusion that 15 per cent has been saved in the diet of the population as at present constituted. It is therefore conceivable that persons more than twenty-five years of age should get along with 1,800 calories per head per day, provided the distribution were handled in a rational manner. Weight may have fallen on the average to about 49 kg. (from 60 kg.). This has not, of course, been evenly distributed among all persons, but has taken place especially among larger people with a correspondingly high body weight. Their efficiency and their nourishment requirements must have decreased tremendously.

The population, functionally and somatically reduced, can then, as we see from the above physiological considerations, get along with nutritive values that vary to an extraordinary extent from the nourishment necessary for the well-nourished worker, who is usually carelessly taken as the example for such comparisons.

In order to piece out the uniform ration so that it may reach the rate cited above, no great amount of additional food is necessary.

However, the population, with the object of maintaining itself, an object that is being less and less assured by the governmental system, which, too, is by no means improving the diet, attempts to secure further food supplies from the country and to a certain extent does succeed in so doing. Unfortunately, however, this in general is not the case, and the failure of the rationing system is constantly making itself more and more strongly felt.

It is, however, possible without great difficulty to bring the rations of the city dwellers to such a point that they will meet the general requirements of a sufficient diet. Both as regards quantity and quality, a better balance between city and country is quite possible.

The early reports of the healthful results of the uniform ration, of the loss of weight, and of the disappearance of all digestive troubles, have not been borne out by later investigations. The many articles published by doctors referred to individual cases many of which, when more closely examined, gave quite other results than the ones announced in the published statements. If these articles were written with the idea of reassuring the population regarding the existing evils, they failed in their purpose. When it is a matter of food shortage and restrictions, each individual is the best judge of his condition. The fear of letting our enemies know where there were several weak spots in our armament was very widespread but very ill-founded, inasmuch as "food-espionage," if one may use the term, was practiced through experts and on a very extensive scale by the embassy of a country that later went over to our enemies. This same espionage is still being practiced today through neutral countries.

(*To be continued*)

MEDICAL WORK IN THE BRITISH ARMIES IN FRANCE[1]

By GEORGE CHEEVER SHATTUCK, M.D.

(With one illustration)

ORGANIZATION

IT WILL be of interest, I think, to consider the important types of hospitals which were used by the British in France and to outline the plan for handling patients.

The hospitals in question were of three principal classes, namely, the "Field Ambulance," the "Casualty Clearing Station" and the "General Hospital."

The Field Ambulance.—A field ambulance war attached to every fighting division in the field. When the division went into the line the field ambulance established itself within reach, and when the division was withdrawn for rest its Field Ambulance retired with it. The functions of the ambulance were to collect the wounded from the regimental aid posts and, when necessary, from the field, to put on dressings and splints, stop hemorrhage and evacuate the cases with the least possible delay to the Casualty Clearing Stations in the rear, where most of the operating was done. The wounded were collected by stretcher-bearers and evacuated by ambulance cars. When "in rest," or when there was no fighting, these units treated the milder cases of sickness which could be cured and returned to duty in a short time.

A hospital of this kind is of necessity small and capable of moving all its equipment in a few hours. It needs few surgeons, but requires a relatively large number of stretcher-bearers.

The Casualty Clearing Station.—Next we have the Casualty Clearing Station or "C. C. S." at railhead receiving cases from the Field Ambulances. A Clearing Station can ordinarily accommodate 500 cases and has facilities for expansion to 1,000. Every army at the front had a number of these units belonging to it. They moved with it when necessary, but moves were not frequent during the period of trench warfare.

The "C. C. S.'s" were generally grouped in the neighborhood of a town but not in it, because towns were much more subject to air raids and shelling than was the surrounding country. Consequently, permanent buildings were seldom available.

The "C. C. S." was intended originally to be an essentially mobile unit, but in the long period of trench warfare the necessity of early

[1] Service at No. 22 General Hospital, British Expeditionary Forces, as a member of the "Harvard Unit" in 1916, 1917 and 1918, and detached duty with casualty clearing stations in 1917 and 1918. Read before the American Climatological and Clinical Association, June 16, 1919.

operating to prevent infection led to increased development, which resulted in diminished mobility. Much of the canvas was replaced by wooden huts, bacteriological laboratories and radiologists became attached, nurses appeared in the wards, and nurses trained in anesthetics released officers for other work. For a long time the physician, as such, had no recognized place in a "C. C. S.," but in the Second Army, at least, physicians were later appointed for all of these units.

General Hospitals.—The large hospitals to which the clearing stations evacuated their sick and wounded were called "General Hospitals." These were on the coast, some in towns where they occupied permanent buildings, and others in open country where huts and tents were erected for their use. Patients came to them by ambulance car from the Hospital Train. The principal avenues for evacuation were the "Convalescent Camps" in France and the "Hospital Ships" for England.

The capacity of most of the General Hospitals was increased several times during the war and finally reached 2,400, comprising about 1,400 permanent beds and roughly 1,000 stretchers or bed sacks.

Work of a General Hospital.—No. "Twenty-two General Hospital" at which the "Harvard Unit" served, and to which I belonged, was provided by the Unit with physicians, surgeons and nurses from America. All the administrative officers were British until Lieut. Colonel Cabot took over the command. The Noncommissioned Staff and the men remained British. Like other general hospitals it had two divisions, surgical and medical, between which ward accommodation was shared in fluctuating proportion according to need.

The "establishment" of a General Hospital included thirty-two officers. The duties of three of them were purely administrative, viz., the Officer Commanding, the Registrar and the Quartermaster. The Chiefs of the Medical and Surgical Divisions were responsible in a general way for the management of their Divisions and took part in clinical work as well. The rest of the clinical work was done by officers assigned to one Division or the other, each officer taking charge of a number of wards. There was an officer in charge of the Clinical Laboratory and another of the X-ray Laboratory.

The number of beds that a physician could look after depended partly on the type of cases he received and the rate at which they were being admitted, but even more on his experience. If he could not keep ahead of the work, evacuations were delayed and beds which should have been vacant remained occupied. Moreover, in busy times the absolutely necessary work increased out of proportion to the admissions, because prompt evacuation became imperative. At such times

the man of experience could do more than two not familiar with work of this kind.

Two wards of 60 beds each, with from 10 to 20 new patients a day, were found to be more than a new man could handle efficiently. He could examine and treat them, but could not dispose of them promptly, whereas the same man a few months later could learn to handle twice that number of stretcher cases or a much larger number of walking cases.

In 1917 and 1918 the number of officers on duty at No. 22 was at all times below the authorized establishment and generally far below it all available officers having been detached for temporary duty with hospitals even more depleted than our own. More and more medical officers had to be sent from the bases to fill vacancies in the forward areas so that, in the last year of the war, shortage of medical officers at the General Hospitals became acute. During this period, with a Staff smaller than at any previous time, our hospital did its largest amount of work.

The principal factors making for efficiency were, I believe, the follow ing: Firstly, the officers had learned every detail of their work; secondly, ward routine and laboratory work were systematically reduced to lowest terms; thirdly, the nurses learned to be very helpful; and lastly, the British officers and personnel coöperated with fine spirit.

The Medical Division.—A rough idea of the work of the medical division can be gained from the accompanying Table I, showing numbers of patients admitted to the Division and their disposal during the month of February, 1918. At that season of the year the Medical Division handled only medical cases in the civil sense.

"Paper work" was, I believe, simpler than in the American Army, but, nevertheless, took a considerable proportion of time when patients were passing through the hospital in large numbers. Many of the forms were prepared by clerks in the divisional offices and from there distributed to the wards for completion. Volunteer clerks from among the convalescents were invaluable in the wards for walking cases, With their help a medical officer could look after a much larger number of patients. In the other wards the nurses and their aids helped also in this work. No patient could be evacuated until the required papers had been completed and signed by the officer in charge of the ward.

To sift and rapidly to dispose of patients was the prime necessity of busy times, and medication became largely a matter of routine.

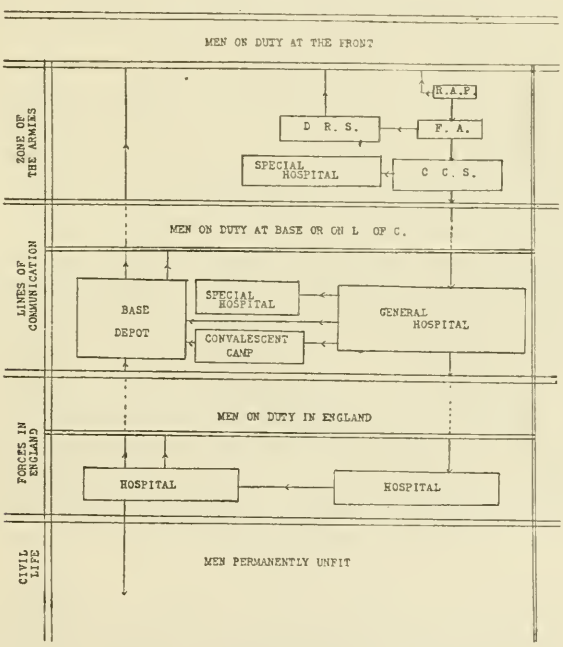
When there was pressure for beds, patients were evacuated as soon as fit to travel, and in these circumstances a large proportion went to England, but in quiet times when they could remain a week or two in the hospital the great majority of sick were evacuated to Convalescent

Camp, from which they passed when fit for duty to the Base Depot.

A few, who recovered while with us, went directly to Base Depot for duty, and the partially disabled or permanently unfit were boarded there for reclassification or discharge from the army.

Contagious diseases were isolated and promptly transferred by ambulance to a hospital designated for their care. Similar special assignments were made for enteric, dysentery, so called "shell-shock," mental disease, and venereal disease. Special labels were required for cases of organic and others for functional nervous diseases destined for England, so that the patients would be sent directly to certain hospitals there. Diagram I shows the main lines of evacuation and some of the subsidiary circuits.

DIAGRAM I



The line of evacuation is indicated by arrows pointing down, transfers to subsidiary hospitals by arrows pointing to the left, and return to duts by arrows pointing upward.

The patients arrived in convoys of from 50 to 500 at a time, and rarely 800 or more were admitted in a single day. They had to be fed, washed, clothed when necessary, classified, catalogued, and redistributed through many channels.

Two military aims were never lost sight of: Firstly, to have at all times enough vacant beds to accommodate a convoy; secondly, to hold

in France for return to duty every man who would be fit for it within the time during which he could be kept in hospital or at convalescent camp. The first of these needs took precedence over the second, and the interest of the individual yielded to both.

It is here that military medicine most sharply differs from civil practice. War requires sacrifice of the individual whenever such sacrifice may contribute to success or to the interest of greater numbers, and this is the lesson which we found the hardest to learn. When patients stayed in the hospital long enough to become known as individuals it was hard to deny them the chance of going to England to convalesce, the more so because home leave for the private soldier could only be provided at long intervals. To write "C. C." or "B. D." on the card of a man who had been long from home, and who would soon again return to the trenches, seemed like imposing sentence upon him because he had not had the good fortune to be seriously ill or to receive a severe wound. After the first two years of war, "Blighty" seemed heaven to the men, and a severe wound a small price for the privilege of going there. One fellow, typical of many, with a ragged wound which laid open the deltoid of his right arm, told me with delight that the doctor "up the line" had said it was "a sure Blighty" and had added that he would give five pounds for one like it.

When convoys were being admitted the strictly medical cases were assigned to wards reserved for their care. When the surgical division became crowded, border-line cases, such as trench feet, went to the medical wards, and vice versa. When a battle was expected the medical cases remaining in hospital would be concentrated in a few wards, and half, or even more, of the medical division equipped to handle wounded. The physicians remained in charge of their wards at such times, for the surgeons had enough to do looking after their own wards and doing the operating. The physicians selected, and sent promptly to the theater, cases urgently requiring operation. Doubtful cases were seen by a surgeon.

When, during the summer of 1916, a large number of cases of chest-wound were admitted, and the physicians were consulted about them, it was soon found that a considerable proportion of these cases did well without operation, and that others required study for which the surgeon had no time. Chest-wounds in our hospital were thereafter admitted direct to one of the medical wards. The same practice was followed at other General Hospitals.

Diagnosis.—The Field Ambulances made abundant use of conventional terms in lieu of diagnoses. For example, "P. U. O.," meaning "pyrexia of unknown origin," stood for various kinds of fever; "N. Y.

D." for "not yet diagnosed"; "Myalgia" indicated pain without obvious cause; "V. D. H." valvular disease of any kind; "D. A. H." "disordered action of the heart" without gross lesion; and "I. C. T.," or "inflammation of connective tissue," included a wide range of minor inflammatory processes.

This system enabled the Field Ambulance rapidly to pass along minor ailments without dealy. The Casualty Clearing Stations and other hospitals farther down were ordered to replace the conventional letters by diagnoses of a definite character.

Cases of serious illness were definitely diagnosed "up the line" and were held as long as necessary at the "C. C. S."

The Casualty Clearing Station or "C. C. S."—The "C. C. S." was generally one of several which received in turn for twenty-four hours consecutively on every second or third day during quiet or "peace times," as they were called. At such times most of the patients were "sick" so that many could be returned to duty within a week.

When fighting was heavy the system changed to one in which cases were received until 200, or some other number previously agreed upon, had been counted. Subsequent arrivals were then directed to the "C. C. S." which had taken over the admitting until they had received their quota, and so on in turn. For making up the quota, the stretcher case was the unit and was counted as one, but the walking cases counted only half as much. For example, the quota of 200 might be made up of 100 stretcher cases and 200 walking cases, or of 150 stretcher cases and 100 walkers.

The walking wounded were redressed and nearly all marked for evacuation at the earliest opportunity. The stretcher cases were examined and classified. Those fit to travel and not urgently in need of operation were sent to the evacuation wards. Patients in bad condition were put in the resuscitation ward, where an officer skilled in transfusion of blood took charge of them. Wounds of the chest were sent to the chest ward, gassed patients to their special wards, and the sick to theirs.

Cases urgently in need of operation, whether officers or men, went to the preoperation ward, those needing X-ray having been so marked. There, lying on the stretcher often in muddy, blood-stained uniforms, they awaited their turn.

In this ward one saw most clearly the calm, patient courage of the British "Tommy." He rarely asked for anything except water. He never inquired the nature of his wound, his chance of recovery, or what would be done. When carried into the theater his face showed relief, but no anxiety. If a leg needed amputation he assented without demur

or emotion. His thoughts were at home in "Blighty," and he expected to get there.

Amid such surroundings one might ask: What can a physician do? The question was answered by experience. At first there were no physicians recognized as such at the Clearing Stations. They were acting as anesthetists. This arrangement was not ideal, because, even when there was fighting, varying numbers of seriously sick were received and gassed cases were sometimes very numerous. These two groups of cases could not be satisfactorily dealt with by a man whose first duty was to give anesthetics, and, moreover, the shortage of medical officers became steadily more serious.

In the last year of the war, nurses were giving the anesthetics, and physicians had been appointed to take charge not only of the sick and gassed cases but also of the chest-wounds in the clearing stations of the Second Army (Table II). Other physicians had been trained as radiologists, some were taking the place of surgeons by rendering efficient service in the receiving ward, and others were taking charge of resuscitation and doing blood-transfusion.

When the influenza epidemic was at its height the battle casualties were light in many parts of the line, but the medical work was so heavy that the surgeons, at times, took part in it. These conditions were exceptional and transitory, but the plan of having a skilled physician on the Staff of the Clearing Station worked well under conditions of all sorts. When, as was occasionally possible, a second physician could be found to take charge of the resuscitation ward or to help with the medical work, it was a great advantage.

Diseases.—The commonest febrile disease in 1916 and 1917 was trench fever, but in 1918 influenza was epidemic and trench fever less frequent than before. The first cases of influenza that I saw in the spring of 1918 were very mild and returned to duty after a few days. In July the disease became more severe, bronchitis was often observed, and occasionally broncho-pneumonia, but I saw no deaths until the autumn, when broncho-pneumonia became not only common but severe and the death rate high.

There was dysentery of the Shiga type in Belgium in 1917, but in 1918 that of Flexner predominated. In both years there was a good deal of afebrile "dysentery" of short duration, the stools showing blood and mucus for a few days and then returning rapidly to normal. Repeated bacteriological examinations having failed to show any more likely organism, the enterococcus was suspected.

Between August and October of 1917 near Poperinghe in Belgium I saw a good many cases of gastro-enteritis. The first cases complained

chiefly of vomiting and a few seemed dangerously ill, but all recovered. They had little or no diarrhea. The type then changed to one in which abdominal pain predominated, and there was occasionally vomiting or diarrhea. About a dozen of these patients which arrived about the same time had on the "Field Ambulance Cards" the diagnosis "Query Appendicitis." In subsequent cases diarrhea with dysenteric stools became the rule. Most of the patients were afebrile and had negative stool-cultures, but among them were a few with fever and in most of these the Shiga bacillus was found.

Typhoid fever in my experience was extremely rare. I saw but one typical case in more than two years of work, and the patient recovered after running the usual course of fever. Paratyphoid was not rare, but we saw surprisingly little of it. Again and again patients who were having a run of fever suggesting mild typhoid were examined bacteriologically with negative results and sent, nevertheless, to the Isolation Hospital as typhoid suspects. Nearly always the diagnosis returned by the Isolation Hospital was trench fever. In the few excepions it was paratyphoid.

The atropine test of Marris was tried on a large series of cases, including many controls and discarded as misleading and practically valueless. The Widal in men who have been inoculated is little better. The Dreyer method, I believe, has some value provided the suspect can be isolated during the period of a week or more during which the series of agglutination tests is being made, but, when the question was whether or not to transfer at once to a special hospital as a typhoid suspect, it was necessary to use quicker methods. Blood and stool cultures answered best, and agglutination in unusually high dilution was regarded as sufficient evidence for isolation.

Contagious diseases were few, both at the Clearing Stations and at the Base. Suspicious throats were always cultured, but generally proved not to be diphtheria but Vincent's angina, of which there was a good deal.

Few cases of meningitis were seen. One young fellow with slight fever had symptoms of hysterical origin simulatng meningitis. Later it was learned that he had had meningitis five years before.

There was a small but interesting group of cases of infectious polyneuritis. Later cases, very similar, showed evidence of lesions of the cord.

Most of the "myalgias" seemed to be trench fever with leg pains, in an afebrile period. There was also a noteworthy number of cases of sciatica often traceable to the sacro-iliac joint. Rheumatic fever was astonishingly rare. A few cases only were seen, and these were subacute.

The "trench nephritis" was interesting in that dyspnea, when marching with equipment, was often the first symptom noted by the patient. It was soon followed by swelling of the legs. The symptoms often increased gradually for a week or two before the man reported to the doctor. Whether or not infection plays a part in the etiology, seasonal fluctuation was observed in three successive years. Nephritis was common in the spring. When warm summer weather had become established, typical cases became scarce. They reappeared in the autumn and early winter after a month or two of cold and wet. This experience points to exposure as an important factor in the production of most cases of war nephritis. Death from nephritis was rare.

To discuss the injuries from gas, the functional nervous disorders, and the chest-wounds would exceed the scope of this paper.

I wish at this time to express gratitude to Lieut. Colonel Cabot under whom I served and to others who helped or encouraged my work.

TABLE I.—*Medical Division.* (Month of February, 1918)

Remaining from last month	Admissions February	Died	To England	C. C.[1]	B. D.[2]	Transferred	Remaining in hospital
988	1591	1	470 18.1%	977 41.4%	246 9.5%	91	794

[1] Convalescent Camp. [2] "Base Depot" for return to duty.

TABLE II.—*Analysis of Chest Work of a "C. C. S." in the Autumn of 1917, Near Poperinghe*

Dates: September 23 to 29, 1917, inclusive

Operated cases: Total 19	*Evacuated to base*	*Died at C. C. S.*
1. Parietal wounds only	5	0
2. Open pneumothorax	2	2
3. "Uninfected" hemothorax	5	0
4. Foreign body removed from pleura	1	0
5. Established infection	3	1
	16 (84.2%)	3 (15.7%
Cases not operated on: Total 51.		
Of these sent to base	46	
Unfit for operation and died at C. C. S.	5	
Total of all cases	70	

A BASE HOSPITAL POST-GRADUATE COURSE

By Major C. F. TENNEY
Medical Corps, United States Army

ALL medical officers, devoted to the progress of medical science should be interested in the recent article published in the J. A. M. A. May 24, 1919, by Lieut. Colonel Foster, entitled "Medical Education as Revealed by the War." In this article, those intimately in touch with the problem will read a just and sincere criticism of our present-day methods in some schools. The purpose of the paper, no doubt, was to present clearly the conditions as found and diagnosed by a careful observer. To tear down, if necessary, the old forms of medical training and education and to open up the possibilities of further exploration and experimentation is perhaps the object of the article. We believe, however, that the author has said nothing which all have not been thinking of, with a long-suppressed desire to prove. Seriously considered, the article is revolutionary and awakening. It may, let us hope, mark a new era in the study and growth of medicine.

We who are still in the service, perplexed by this very comprehensible difficulty, have tried to find the solution. In the medical service of the base hospital at Camp Upton, we have been for some time experimenting with a solvent. Frankly, our solvent is composed of no new fundamental elements, no new properties, but simply is endowed with a new recognition and an open field for investigation. It is almost the score old application of professional education principles as stated by such an eminent educator as Professor Dewey of Columbia University and just now beginning to find recognition in the medical world.

In order to overcome some of the abstract results of medical schooling, to quiet the feeling of dissatisfaction, to stimulate the kind of professional work desirable, and in general to develop and broaden the study of internal medicine, an extensive program for the realization of such ideals has been put into execution. The chronic enemy of new ideas always comes forth with these juvenile questions: "Why an extensive program?" "Didn't things run all right before?" "Does your new plan have any effect on the mortality rate?" We have nothing to say to these questions. We desire to be sympathetic, courteous and indulgent. But in conclusion we might say that Lieut. Colonel Foster's article is sufficient proof of the necessity of doing something definite. So we had thought it wise, in accordance with undeniable facts plain to us some time ago, to start a post-graduate medical course with practical instruction, a medical library in close proximity to the Medical Service Office, a

statistical and research department to promote and encourage coöperation and individual expression among the officers, following this up with personal instruction and advice wherever necessary. In brief we will outline the courses as we are carrying them out.

1. *A clinic* to which all medical officers of the base hospital are required to be present is held in the Red Cross Building every Wednesday evening. Three or four papers with demonstration of cases are presented. In so far as possible one department presents the entire program for the evening. This is followed by examination of the cases and general discussion. Many lantern-slide demonstrations have been given, pathological specimens demonstrated, and with the large variety of clinical material at hand much interest has been shown. Nobody will deny the fact that the life of any doctor in the service is somewhat foreign to his former existence. We have decided that the best way to solve this problem would be to invite discharged medical officers to give us an evening on their work in civil practice. In other words, we are trying to desensitize our men to the conditions they must expect to meet on their return home.

2. *Ward walks* are held in the various wards of the service on Tuesdays and Thursdays between 11 and 12 noon. Each ward surgeon selects two or three carefully worked-up cases to be shown on the date that the service visits his ward. The courses of instruction in the wards are made as practical and as intimate as possible. We have found, as Lieut. Colonel Foster stated, that many of our men are ignorant of the lumbar puncture. At one of the ward walks a meningitis case was presented and the method of serum administration demonstrated. To follow up the object of this demonstration every officer has been assigned to this form of work, giving him an opportunity to try out and perfect his own technique under the most careful instruction. In other words, we are trying hard to strike what we know to be the keystone of success in medical diagnosis, the happy harmonization of theory and practice.

Ward walks of great value have been held in the pneumonia wards, many cases presented, histories reviewed and personal examinations made by each surgeon present. Differential diagnosis and the many complications were discussed with relation to all pulmonary diseases. At another time a case of tuberculosis was presented to our staff in the tuberculosis ward. The ward surgeon was the instructor and had worked up the case well. This was his opportunity to show the kind of work he was doing. He was intelligent and appreciated the situation. What is the worth of all the combned medical knowledge of the world, pent up in one man, if he has no outlet for expression? First, the history of the tuberculosis patient was read and then commented upon

by all present. Second, the patient was examined by all and the physical findings discussed. Third, the X-ray plates were shown and the aids and limitations of this method of diagnosis fully explained Fourth, the sputum smear, typical of a positive case of pulmonary tuberculosis, was examined. Fifth, the disposition of the case was considered. This in turn led the way to a further discussion on the disposition and segregation of all pulmonary cases, the advantage of an early diagnosis, the isolation of positive cases for the safety of the community, and the early separation of either positive or suspicious cases from a poor environment.

3. *The Pathological and X-Ray Laboratories.*—Officers are assigned to these laboratories on Mondays, Wednesdays and Fridays from 11 to 12 noon. They have here the opportunity of reviewing laboratory work, of observing the use of the X-ray and studying new methods and technique. The officers are allowed free access to these laboratories to come and go as they please and to carry out any special or research work under the guidance of those in charge. The contribution that these laboratories are making to the entire scheme is important and may well be appreciated by all connected with the service.

4. *The Medical Service Conference* is held on Friday afternoons from two to three o'clock. The ward surgeons talk over the many difficulties arising in ward management and, if necessary, the professional care of their patients. At this time complaints and suggestions are considered. The service, by means of open talks, tries to alleviate the dangerous and undermining power of undertone criticism. Outside of this general conference, three short papers by officers of the medical service are scheduled for each meeting. The object of these papers is to review thoroughly important medical subjects. At a recent conference the entire subject of malaria was taken up, first by a review of the past experience with the disease, the method of diagnosis and treatment; second, by the examination of two cases, followed by short talks on their histories; third, the laboratory end of the subject in which the method of smear taking was shown and a microscopical examination made by each officer. Certainly no course of instruction could be more advantageous to the individual. At another conference gastric lavage was performed, and the stomach contents were analyzed in their presence. The comparison of the two cases examined with the normal helped to fix in their minds again what a gastric content should reveal to be normal.

5. All *autopsies* are required to be attended by all medical officers. There the history of the case is read, and the officers become familiar with the gross pathology of the case. Later, as soon as the specimens

are ready for demonstration at the laboratory, the officers report for a microscopic review of the case.

6. *Rotary Service.*—The ward service is so arranged that the men spend only a certain amount of time doing a certain class of work. They are then transferred to another ward, a change of service being thus maintained. However, men especially fitted in certain lines of work, such as chest, kidney or gastro-intestinal, are the supervisors of that work and aid in the instruction of others.

7. *Lectures.*—Officers, adapted for giving lecture courses are called upon to give the different lectures on medical subjects as outlined in the curriculum of work for the training school for nurses carried on in connection with the hospital.

8. *Ward Schools.*—Ward surgeons are constantly reminded that in certain senses their wards are to be regarded as small schools and that they are to devote their attention to the instruction of their ward assistants, with especial reference to the student nurses and wardmen, the latter to be given individual instruction in first aid work.

9. *Medical Library.*—As a privilege to all officers of the hospital a medical library has been established in connection with the service. Medical journals, reprints and recent books have been selected with great care. In this we are greatly indebted to the assistance of the hospital representative of the American Library Association, who has obtained many needed books and other literature for us. It has been the object in the selection of reading matter not only to obtain books dealing with well-known medical subjects but also, if possible, to present the various fields open for medical and pathological research and to touch on the broad character of the community life to which the officer must needs return. By making this library available for surgical, laboratory and medical men alike, it is expected that the lack of coöperation and irritating differences that arise between different departments as the result of separation and over specialization will now be eliminated. It is hoped that the officers, in meeting together from all departments and services, may engage in interesting and instructive discussions and a greater hospital coöperation realized. And, finally, thus may be realized the ideal that the medical man will become somewhat surgical and the surgical man somewhat medical.

10. *A Clinical Research Statistical Department* has been established. Three points of prime importance should be cited in the development of this department: First, to encourage personal research work of each officer; second, to assist in the compilation and presentation of medical subjects; third, to have readily available, at all times, information of a more or less general nature. Some of the important general informa-

tion included is the variety of diseases passing through the service, mortality percentages, complications and all possible data on the different classes of cases. A cross card index filing system has been in use for some time, making easily available all information on any particular line of cases. All charts of patients passing through our service go through our office prior to final filing in the registrar's office. Officers are encouraged in every way possible to do their work in joint coöperation with this department. How does this work out? For example, a certain ward surgeon was asked to present an article on Type 1 Pneumonias before one of our Wednesday night clinics. His first move toward the preparation of the subject was to get in touch with the statistical office. He stated his case and enlisted their aid. In a short time the information was ready. There was first of all a complete list of Type 1 cases, a series of ratios showing their relation to all other pneumonia cases, to other diseases and to the daily camp census. There was information, also, of an epidemiological character. There was information concerning serum treatment and laboratory findings, complications, X-ray reports and post-mortem examinations. Together with the department he worked out a graphical chart showing the temperature, pulse and respiration curve of typical cases. Could the officer have asked for any more coöperation and encouragement in the work he was doing?

What reaction does he experience? He soon becomes enthusiastic with the object of the department. Why? Because he knows that everybody, from the office assistant to the Chief of Service, is behind his problem. He has definite facts and information to utilize as raw material. When a captain of industry has at hand quantity and quality of raw material his business will not fail except for the lack of effort. So it is with our officers. They become greatly impressed with the idea that they are doing something that is worthy of all their efforts, something that, when done, will be complete and lasting.

In consideration of the fact that there is a certain amount of routine ward work it has not been found practical to introduce more courses than are listed above. The program has proven a success from many standpoints. The officers have almost forgotten to worry about their discharges and are doing better work. In conclusion, we have decided that the hospital is large enough, that the equipment is adequate, and that little was required but the proper method and spirit. With due consideration to theoretical requirements, our present results encourage us to believe that we have in part solved the problem as set forth by Lieut. Colonel Foster, at least as far as a military hospital is concerned.

ORTHOPEDIC SERVICE IN THE BRITISH GENERAL HOSPITALS

By Lieutenant Colonel ROBERT B. OSGOOD

Medical Corps, United States Army

EXPERIENCE BEFORE AMERICA ENTERED THE WAR

A FAMILIARITY with the surgery of the present war was gained by certain American surgeons before America herself entered the war. Some of this familiarity came from service with the French, chiefly at the American ambulance at Neuilly, just outside of Paris, and at the small accessory hospitals at Jouilly conducted under the same auspices.

The services in these hospitals, beginning in January, 1917, were in most instances of short periods of three to six months, but almost concomitantly with these the British Government accepted the services of American units in certain of the general hospitals in France and in certain special hospitals in England. It became evident that a very large percentage of wounds, perhaps 70 per cent, would consist of lesions of the extremities. This meant that motor function would be threatened in a large proportion of these extremities. The previous civilian training of orthopedic surgeons more nearly fitted them to conserve and restore function in this class of lesions than the training of any other specialty. Convinced of the wisdom of medical preparedness, certain of the American physicians who had been working in the French and English hospitals began to agitate the question of forming American base hospital units. This agitation was given constructive form by Gen. Jefferson R. Kean, serving at this time in the American Red Cross.

ORGANIZATION OF AMERICAN BASE HOSPITAL UNITS

Under the aegis of the American Red Cross, these units were organized all over the country from the staffs of large hospitals and the faculties of the medical schools. At least one, and, in many instances, several orthopedic surgeons were enrolled in nearly all these base hospital units, and when in the spring of 1917 the British Government, through its Medical Department, asked the United States Medical Department for six base hospital units to take over six British general hospitals in France, the entire personnel and most of the equipment of the six were ready.

ORTHOPEDIC SURGEONS ATTACHED TO FIRST SIX BASE HOSPITAL UNITS

Each of these hospitals was organized under a director, and on each, with one exception, was an orthopedic surgeon.

The Lakeside hospital unit of Cleveland was organized with Maj. George W. Crile as director and Capt. Gordon Morrill as orthopedic

surgeon. The director of the Harvard unit was Maj. Harvey Cushing, and Capt. Frank Ober was orthopedic surgeon. The director of the Washington University unit of St. Louis was Maj. Fred T. Murphy, and Capt. Nathaniel Allison was the orthopedic surgeon, with two assistants. The director of the Pennsylvania Hospital of Philadelphia was Maj. Richard Harte, and Capt. William J. Taylor was orthopedic surgeon. The director of the Presbyterian unit of New York was Dr. George W. Brewer, and Capt. Armitage Whitman was orthopedic surgeon. The director of the Chicago unit was Major Beasley, but no surgeon was assigned to this unit specifically as an orthopedic surgeon, although Captain Speed had devoted much attention to bone and joint surgery.

ASSIGNMENTS OF UNITS TO BRITISH GENERAL HOSPITALS IN FRANCE

Within a week of the arrival of these units in England, they were assigned to British general hospitals in France. No. 4, the Lakeside hospital unit, to General Hospital No. 10 at Rouen; No. 5, the Harvard unit, to General Hospital No. 11 at Dannes Camiers; No. 21, St. Louis, Washington University unit to General Hospital No. 12, at Rouen; No. 10, the Pennsylvania hospital unit, to General Hospital No. 16 at Le Treport; No. 2, the Presbyterian unit, New York, to General Hospital No. 1 at Etretat; No. 12, the Chicago and Northwestern unit, to General Hospital No. 18 at Dannes Camiers.

OUTLINE OF WORK IN THESE GENERAL HOSPITALS

The histories of these hospital units will be found elsewhere. It concerns us chiefly to describe the work of the orthopedic surgeons attached to these units. These hospitals were receiving cases through the British casualty clearing stations, which, in times of push, acted in many cases simply as dressing stations, and therefore many of the cases were received within twenty-four to forty-eight hours after they had been wounded.

In times of comparative quiet the cases usually remained two or three days in the casualty clearing stations, and definitive operations in the majority of the cases had already been performed. This made the surgery of the general hospitals, to which these units were assigned, very varied.

In times of push the surgery would be practically that of a casualty clearing station. In times of comparative quiet the surgery would be that of a base hospital. In many of these hospital units the orthopedic surgeon was given charge of the fractures and joint injuries, and, since the administration of the hospitals was under the British, all supplies were obtained through British depots.

TYPES OF SPLINTS EMPLOYED IN BRITISH GENERAL HOSPITALS

The splints were British patterns and represented the result of a gradual simplification of methods which had been taking place during the course of the war. The evolution had been slow, and there were still nearly fifty different types of transport splints.

Plaster of Paris was rarely used, and the quality of the plaster of Paris bandages furnished by the British Government did not encourage their very general use. The American orthopedic surgeons had depended to a large extent, both in civil life and in their early war work, upon plaster bandages in the treatment of bone and joint conditions and simple fractures. These fractures, accompanied as they were by infected wounds, made its use difficult if not actually inadvisable, and they were thrown back on some form of open splints as the only practical method of meeting the conditions which required immobilization and free access to the wounds.

TREATMENT OF FRACTURES IN BRITISH GENERAL HOSPITALS

By the British plan, patients received in the general hospitals in France were expected to remain about two weeks, or until such time as their transport by hospital train and hospital boat to England could be safely undertaken without danger to their general condition, without risk of lighting up their infection, and without jeopardy to the position of the bones. In practice, however, it was soon found that many of the complicated infected fractures and joint injuries needed to remain a much longer time in the general hospitals in France before their transport to England was safe.

The mortality with the fractured thighs had been alarmingly high, and soon after the units arrived a general order was issued that no fractures of the femur should be sent to England until they were entirely healed. This enabled the cases of importance to be followed until the convalescent stage was reached and furnished an excellent opportunity for training these orthopedic surgeons in the typical and important bone and joint casualties of the war.

The use of the open fixative and traction splints, which were rather forced upon these surgeons in the English general hospitals, led them to respect the principles underlying these splints and enabled them to become familiar with their use, which familiarity bred enthusiasm. Thus, when the question of the American transport splints was raised, definite data were on hand—data based on experience covering several months.

The proportion of bone and joint casualties is always large, and in these English general hospitals, as has been said, many fractures—in

several of them, all fractures—fell to the care of the orthopedic surgeon and his assistants. The joint injuries also proved of extreme interest and became orthopedic problems.

PRIME REQUISITES IN TREATMENT OF BONE AND JOINT CASUALTIES

Two things stood out above all others in the treatment of these bone and joint casualties—the necessity for immediate immobilization and the need for immediate operations. Immediate immobilization seemed to be an end possible of attainment and was actually accomplished in the United States Army. By placing the standard splints far forward in the battalion dressing stations and instituting a very thorough and universal splint drill in all the combat divisions, it was possible to immobilize these fractures and joint injuries almost as soon as they were received. Our stretcher-bearers were as brave as any, and the picture of one of these men, his arms full of splints, in the act of applying them to two wounded men in No Man's Land should be painted. All three were dead.

The second necessity is immediate operation, which is, of course, closely associated with the problem of splinting. Transport is infinitely expedited by proper immobilization. When the cases reached the general hospitals many of them had had, as we have said, definitive operations performed, but in times of push the bone and joint surgery became acute.

CLINICAL DATA

New conceptions of the resistance of the synovial membrane had to be formed. Joints which were received in a very precarious condition often quieted down under simple immobilization and traction. It became an important and difficult thing to decide when definitive operations should be undertaken in these cases received more than twenty-four hours after the original wound. Frequently the irritation and inflammation present when the patients were received was proved to be due to the trauma of transport. With foreign bodies existing in the joints, removal was simply a question of time, but that there was a question of time seemed proven by our experience. Noticing that many joints, in which the X-ray showed no foreign body, quieted down completely under efficient immobilization and traction, although they were extremely threatening on entrance, we began to watch a few selected cases in which foreign bodies were still present in the joints and in which an inflammatory reaction existed.

Under immobilization many of these joints quieted down as the others in which no foreign body was present had done, and we were able to choose a time for operation which seemed to offer less danger than an

immediate operation on entrance would have offered. In other words, the time was chosen when the local signs of inflammation were subsiding and the resistance of the body to the invading organism was at its height.

We realize that this is heretical doctrine to teach, and with our modern methods of more perfect control of early sepsis it would undoubtedly be safer to adopt, as a working rule, the removal of all foreign bodies as soon as they were discovered to be within the joint cavity. The individual case might not perhaps attain as perfect function, but there ought to be no tragedies. Only almost hourly inspection of these cases would make it justifiable to follow these dilatory tactics.

The joint cavity was reached by the path of the missle, and the devitalized tissue was carefully dissected away along this track. Then, after as complete a mechanical and chemical sterilization of the path as possible had been accomplished, instruments and gloves were changed and the synovial cavity was opened, the foreign bodies removed, and the joint cavity thoroughly irrigated by means of a continuous stream of mild antiseptic or sterile salt solution running in through a soft rubber catheter passed into the deepest recesses of the joint. This irrigation lasted for ten to fifteen minutes and unless the infection gave evidence of being very virulent or if the disorganization of the joint were not great, the synovia was tightly closed with continuous catgut suture and a small drain inserted through the external wound running down to the synovia but not into the joint cavity. In cases where the infection was more extensive and severe than we had anticipated, the joint cavity was drained by lateral incisions, and occasionally by postero-lateral incisions, in order to reach the popliteal space. In these early days the value of the Dakin treatment was still *subjudice*, and, while we employed it with great satisfaction in certain cases, it had not become the routine treatment in all.

It would probably be safer at the present day, as we have said, to advise the removal of all foreign bodies in joint cavities at the earliest possible moment, and if this earliest possible moment were more than twenty-four hours after the reception of the wound and the infection was well established, to advise also, the institution of the Dakin-Carrel treatment at once, or treatment after the methods of Willems. The joints in which the Dakin-Carrel treatment has been used will in a very large number of cases become ankylosed, but even this untoward result brought about by treatment is sometimes the only result which one must expect after the subsidence of a severe joint infection, and severe joint infections without this treatment often risk the life of the patient.

These more or less clinical data are inserted in this historical review

to indicate the importance of the training which the orthopedic surgeons received at the British general hospitals. The training gave them experience in the treatment of this important class of cases, and played a part in the final standardization of splints for the Medical Department of the United States Army.

The cases in which these splints were employed and which were sent to England to the home hospitals were followed by means of reply postals. It soon became evident that transport was well borne if these splints, which combined fixation and traction, had been well applied.

Two of the orthopedic surgeons assigned to the English general hospitals later became assistant directors and finally consultants for the Division of Orthopedic Surgery, A. E. F.

We are aware of no other experience which could have proven of so great a value in training men to care for our own bone and joint casualties or could have given these men a broader point of view of war surgery in general.

A REPORT OF THE INTENSIVE ANTI-TYPHOID CAMPAIGN IN SOUTHWESTERN GERMANY, INCLUDING AN ANALYSIS OF DATA ON SEVENTY-ONE TYPHOID CARRIERS UNDER OBSERVATION BY THE LABORATORY AT TRIER, GERMANY.

By Major PAUL A. SCHULE
Medical Corps, United States Army

(*Concluded*)

Origin of new cases of typhoid fever.—During the campaign a special effort was made to determine the exact or probable origin of new cases of typhoid fever. In the whole area, during seven years, 10,149 cases were reported and the source of the virus was successfully determined in 5,589, or 58.2 per cent for the whole. But there was considerable variation in the percentage of successful determinations at the different institutes, one laboratory succeeding in tracing the origin in 77 per cent of cases, another laboratory in only 30 per cent. This variation is due, partly, at least, to differences in the opinion of individual observers as to what constitutes "proved origin."

It is worth while quoting the report that in the above 5,889 cases, infection was reported as caused by—

1.	Contact	in 4,202 cases (71%)
2.	Water	in 399 cases
3.	Milk	in 309 cases
4.	Food	in 141 cases
5.	Dirty linen	in 39 cases
6.	Nursing	in 108 cases
7.	Soil	in 5 cases
8.	Manure and privy vaults	in 26 cases
9.	Other possibilities	in 25 cases
10.	Laboratory infections	in 11 cases
11.	Teachers to pupils	in 10 cases
12.	Impartial cases	in 614 cases

It is evident that this table emphasizes the importance of the rôle of contact in the spread of typhoid fever.

Difficulties in the work were numerous. It is pointed out that the discovery of the relation of a new case *merely* to a previous case is unsatisfactory. Such a finding does not demonstrate the ultimate source. Again, the work involved in making a complete investigation of all possible contacts is tremendous, prohibitive. House-to-house investigation of all individuals in a community only is indicated in the

face of the regular reappearance of unconnected cases in the population. Sporadic cases do not warrant carrying the search outside the more obvious contacts. To discover possible new mild cases, and therefore temporary carriers, the taking of the temperature of the immediate contacts of typhoid cases has given good results.

More recent history of typhoid in the area.—In the area served by the laboratory at Trier it has been possible to secure figures for the years 1912–1918. In this limited area the figures for actual cases are as follows:

1912	1913	1914	1915	1916	1917	1918
391	338	277	320	343	533	502

There was, therefore, a decrease from 1912 to 1914. In 1915 there was a considerable increase, with a remarkable jump in the number of cases in 1917 and a slight decrease in 1918. It is interesting to note that the dysentery cases for the same period were:

1912	1913	1914	1915	1916	1917	1918
4	0	18	149	231	760	222

This dysentery is reported chiefly of Shiga type of bacillary dysentery. The relation of the bacillary dysentery case-incidence to the typhoid case-incidence is noteworthy.

The war affected considerably the anti-typhoid work in the are. The following factor may be mentioned:

1. Troop movements.
2. Influx of foreign population, prisoners, munition workers.
3. Return of soldiers on leave, sick, or wounded from France, Russia, the Balkans, etc.
4. Withdrawal of personnel from institutes.
5. Laboratories' supplies, in some particulars, lacking, *e. g.*, agar was 124 marks a pound and not to be secured in adequate amounts.

SUMMARY OF REPLIES TO "TYPHOID" QUESTIONNAIRE

On January 27, 1919, a questionnaire was submitted to the Geheimrat physician of the administrative district and all the kreisärzte and laboratories for the control of typhoid fever within the area occupied by the American Army.

The questionnaire in translation is attached.

This summary is based on replies received from the kreise of Berncastel, Saarburg, Trierland, Daun, Mayen, Cochem, Neuwied, Altkirchen, Adenau, Coblenz, Prüm, Ahrweiler, Wittlich, St. Wendel and the Stadtkreis of Trier.

Typhoid cases and deaths have occurred as follows (the mortality by years is also shown):

	1912	1913	1914	1915	1916	1917	1918	*Total*
Cases.....	391	338	277	320	343	533	502	2,704
Deaths.....	37	23	28	26	23	52	39	228
Mortality (per cent)	9.7	7.0	10.1	8.1	6.7	9.8	7.8	8.4

Paratyphoid cases have been entirely of the paratyphoid-B type. Cases of paratyphoid have occurred as follows:

1912	1913	1914	1915	1916	1917	1918	*Total*
44	56	21	49	48	41	20	279

There has occurred, therefore, approximately one case of paratyphoid-B for every ten cases of typhoid.

Bacteriological diagnosis.—The replies are in many cases not clear on this point. The Widal test was done practically always. Cultural diagnosis was rare, considerably less than in one-half the cases.

Carriers.—Carriers under observation for the various yearly periods show:

1912	1913	1914	1915	1916	1917	1918
80	96	97	107	116	112	115

Chief source of origin of new cases.—The replies vary somewhat. It must be remembered that the personnel of doctors in these areas has changed considerably due to the war. The following opinions are given:

5 report contact only as chief cause.
4 report contact and imported cases as chief cause.
3 report water and contact as chief cause.
2 report water and contact and imported cases as chief cause.
1 report water, milk and contact as chief cause.
1 report water only as chief cause.

Carriers, how discovered? To this question, the replies may be grouped as follows: 4 replied, from examination of convalescents and contacts; 6 replied, from examination of contacts; 2 replied, from examination of stools and urine; 4 replied, not done.

Was the house-to-house search for cases and carriers effective? Six replies were unsatisfactory, 5 replied that it was not done, 3 replied "Yes," 1 replied that it was done only on the occurrence of a case, 1 replied that it was effective when done.

(The question was perhaps misunderstood and perhaps the question was based on misinformation. The fact is that the house-to-house search, meaning the investigation of every person in a community, was never done except in one or two instances involving a very restricted area. An investigation of all the inmates of a house where a case occurred and even of neighboring closely associated dwellings was the rule.)

Was the house-to-house search done in the last six years? One replied

"yes, following each new case." The rest of the replies were negative or unsatisfactory. See preceding paragraph.

Was the educational propaganda effective? Five replied "Yes," one of these adding that "secondary cases *do not* occur;" 1 replied "Doubtful, secondary cases *do* occur"; 1 replied "Probably;" 1 replied "No, carriers don't follow directions"; 5 replied unsatisfactorily, explaining that they had not had sufficient experience (The personnel has changed on account of war); 3 replied that no educational propaganda was carried out.

What is the per cent of undiscovered carriers per total population? This difficult question was unanswered fifteen times. Only one hazarded a guess, one-eighth of 1 per cent.

Paratyphoid carriers: 2 reported one each; 14 reported none.

Bacilli associated with food poisoning: 15 reported "none;" 1 reported 6 cases of botulism.

Dysentery during last seven years was reported as follows:

	1912	1913	1914	1915	1916	1917	1918
Cases	4	0	14	138	224	681	594
Deaths	0	0	1	24	21	113	63
Mortality rate (per cent)	....	....	7.1	17.4	9.4	16.6	10.6

The above figures, as near as can be determined, are for the civilian population. The figures for the military population are very incomplete and unsatisfactory. They follow:

	1912	1913	1914	1915	1916	1917	1918
Cases	0	0	4	11	7	79	163
Deaths	0	0	1	0	0	?	21
Mortality rate (per cent)	....	....	25	0	0	?	13.5

Dysentery bacteriological diagnosis.—The cultural diagnosis was very rarely done, judging from the reports. The Widal test was used, but how much it is impossible to say.

Epidemics of dysentery.—Eight small epidemics are mentioned, one in an asylum, three of the others are reported as due to cases imported with returning soldiers.

Chief method of spread of dysentery is reported as follows: 12 give contact as chief cause, 2 give no reply, 2 give flies as chief cause.

Stool examinations for dysentery.—According to the replies this was rarely done.

Trier laboratory report.—Inasmuch as this laboratory covers considerable of the same ground dealt with in preceding portion of this paper, it was considered necessary to summarize it separately. The following table shows actual number of cases of typhoid and dysentery, with the mortality in each instance, and separately for the military and civil population.

	1912	1913	1914	1915	1916	1917	1918
Typhoid total	137	101	247	128	132	206	178
Deaths total	16	15	37	15	15	21	16
Civilian cases	137	99	112	95	126	196	173
Civilian deaths	16	15	16	11	13	20	15
Military cases	0	2	135	33	6	10	5
Military deaths	0	0	21	4	2	1	1
Bacteriologically proven	131	94	238	121	121	171	158
Widal reaction done	131	97	238	125	125	202	171
Widal not done	6	4	9	3	7	4	7
Carriers under observation	58	69	76	78	78	78	80

	1912	1913	1914	1915	1916	1917	1918
Dysentery total	10	0	46	20	32	240	
Dysentery deaths	0	0	2	2	0	3(?)	
Civilian deaths	0	0	2	2	0	3(?)	
Military deaths	0	0	0	0	0	0(?)	
Bacteriologically proven	10	0	43	18	31	240	
By Widal test	0	0	26	14	19	239	
Shiga	0	0	14	2	14	154	
Y	0	0	12	11	5	85	
Flexner	0	0	0	1	0	0	
By stool culture	10	0	19	4	12	10	
Shiga	0	0	0	1	0	6	
Y	0	0	16	3	0	4	
Flexner	0	0	3	0	2	0	

In 1918, because of lack of laboratory material, the Trier laboratory had to give up the diagnostic work on dysentery. The Trier laboratory gives the following figures on the source of infection of typhoid fever (72 per cent of cases were "determined"):

	Per cent
Contact with typhoid cases	60
Contact with carriers	5
Imported cases	5
Water	1
Milk	1

In the first two years of the war, the imported cases amounted to about 50 per cent of the total.

Carriers were discovered by investigation of the area and associates of typhoid cases. *Control of carriers* is considered the most effective and most important principle in the fight against typhoid fever. *Educational propaganda* has been *most effective. Paratyphoid fever* has been entirely of the B type, 310 cases in the last seven years.

Paratyphoid carriers.—Seven paratyphoid-B carriers were discovered.

Of other intestinal bacteria, especially those associated with food poisoning, only one case occurred in seven years, this due to *Benteritidis.*

Dysentery and stool culture.—Bacilli of dysentery were discovered in only 10 to 15 per cent of all dysentery cases. This is due to the slight viability of the organisms, especially to long transport to laboratory.

QUESTIONNAIRE

(Answers to be made by paragraphs numbered to correspond with questions.)

TYPHOID FEVER

1. How many cases of the disease occurred in the territory under your jurisdiction in 1912 ....., 1913 ....., 1914 ....., 1915 ....., 1916 ....., 1917 ....., 1918 .....? (Do not include figures for paratyphoid among these figures.) Separate soldiers from civilians and give places where these cases occurred.

2. Were all cases bacteriologically proven?..... Widals?.....

(*a*) Were Widal reactions made in every case?.....

(*b*) In how many cases?.....

(*c*) In how many cases not used?.....

3. How many deaths?..... Civilians?..... Soldier?.....

4. Name what you believe to have been the chief causes of infection in order of their importance and give your reasons.....

.....

.....

5. How many bacillus carriers were under surveillance by you in 1912?..... 1913....., 1914....., 1915....., 1916....., 1917....., 1918.....?

6. How were these carriers detected?.....

.....

7. Do you believe the house-to-house search for carriers, as originally conducted, succeeded in disclosing most of the carriers?.....

(*a*) Has this been done at any time within the last six years by your laboratory? ..... If so, give reasons, places and dates.....

.....

8. Do you believe that the educational propaganda against typhoid among carriers, has aided materially in reducing the number infected by them? Reasons?

.....

9. What percentage of the population do you believe to be undetected carriers? ..... Upon what do you base these figures?.....

.....

PARATYPHOID FEVER

1. How many cases of the disease were due to the bacillus of the Alpha type during the years 1912 to 1918?..... Of the Beta type?.....

2. Were any carriers found?..... If so, were they of the Alpha or Beta types?.....

3. In these years were there discovered any infections with B. enteritidis, suipestifes, or any of the other intestinal group of bacilli usually associated with cases of food poisoning?.....

DYSENTERY

1. Give number of cases and places occurring in the years 1912....., 1913....., 1914....., 1915....., 1916....., 1917....., 1918..... Separating soldiers from civilians, also give the number of deaths, civilian and military.....

.....

2. Were all of these cases bacteriologically proven?..... Tell how, and what types of organisms were found.....
.....

3. Give brief history (not over 300 words) of the largest epidemic, causes, proof, anything worthy of note.

(18 lines.)

4. What have been the chief methods of spread of the disease?.....
.....

5. What percentage of all the patients whose stools have been examined for the dysentery bacillus on account of having diarrhea have been found to contain the organism?..... Do you believe the figures to be too high or too low?..... Wherein does the error lie?.....

Report on The Royal[1] Institute for Hygiene and Infectious Diseases, Saarbrücken

The laboratory was established in 1902 as one of eleven similar laboratories founded at the same time to assist in the intensive campaign against typhoid fever in southwestern Germany. (See "Report on the Intensive Anti-typhoid Campaign in Southwestern Germany, March 18, 1919.)

Bacteriology.—Work on paratyphoid fevers was, of course, included from the start, and bacillary dysentery was soon added for investigation.

From such a beginning, the institute developed into a public health laboratory making examinations, also, of material for tuberculosis, glanders, syphilis, gonorrhea, chancroid, pneumonia, influenza, diphtheria, cerebro-spinal meningitis, cholera, typhus, plague, etc.

However, the diagnosis and treatment of rabies is not done, nor are therapeutic sera and smallpox vaccine virus prepared. Autogenous vaccines are made.

Private examinations, that is, special work for physicians for which a fee is charged by individual workers at the laboratory, is permitted.

Chemical examinations are also done to assist in the diagnosis of disease as may be requested. But the chief chemical work is the examination of public and private water supplies, the study of sewage and sewage disposal problems, the examination of smoke and air in their relation to public health in factories, mines, and public places. The nutritive value of foods has engaged especial attention during the past few years.

Educational.—Courses are given to physicians and especially to the Kreisärzte, or local health officers, on public health problems. The institute has a lecture hall seating, perhaps, 200 people. This hall is well-equipped with platform, desk-chairs, projection apparatus and curtain. The room may be darkened for lantern-slide lectures.

[1] "Royal" has been changed to "Prussian."

There is a room for the practical demonstration of methods of disinfection. This room is fitted up as a bedroom of the usual type. There is a disinfecting apparatus, fitted on a hand cart, one of which is placed with each Kreisärzt. Thus the public health officer of the smaller districts is given a very practical training in this important feature of his work.

Maintenance.—Each Kreis (smallest administrative district) may have free service of the laboratory by paying an annual tax of 6 marks per one thousand inhabitants. This optional tax is paid by practically all "Kreise." In addition, 3 marks is paid by patient for an examination for syphilis or gonorrhea, unless the patient is financially unable. Any balance required for maintenance is furnished by the Prussian State.

Location and building.—Since 1912 the institute has occupied a building on the Unssberg, a considerable height overlooking Saarbrücken. A hospital is close by, but, in general, the laboratory is not centrally located in the city. The director confessed that the location was a mistake from the important standpoint of keeping in touch with the physicians.

The building is excellent, incorporating all ideas as to modern laboratory construction. There is a director's office and private laboratory on the ground floor, also a receiving office for specimens conveniently located, a large record office, a media-preparation room, a wash-room (kitchen) a special small room for autoclaves, a special small room for incubators, a room for ice-boxes, a toilet, and a large bacteriological laboratory. On the second floor is the assistant director's office (in charge of the chemical division), a private laboratory and a large chemical laboratory, the large lecture room mentioned above, and a good library. On the third floor is a small laboratory, equipped at this time as a bubonic plague laboratory where very complete preparations had been made for a possible outbreak of plague in Germany, portable equipments, etc. On the third floor, also, a photographic room containing a photomicrographic apparatus of excellent pattern; a drawing-room for drafting, illustrating, etc.; and several baths. The basement contained among other things the disinfection-demonstration room and quarters for the help.

Personnel.—There is a director in active charge of the bacteriological division. In this bacteriological work he has four assistants, all doctors of medicine. There is an assistant director, in immediate charge of the chemical division with two assistants, doctors of philosophy. In addition there are four women assistants (*Laborantinnen*) and several workers (*Dieners*).

Administration.—The director is responsible to the Prussian Ministry

(formerly *Minister*) of the Interior. He has nothing to do directly with the German government (imperial government) nor with the city government. His position is an advisory one, in particular to the president of the *Regierungsbezirk* (Administrative District). He has no police powers directly.

The director of the institute at Saarbrücken is the scientific adviser to the institutes at Trier and Idar in the same district.

Records.—Forms are supplied to be filled out to accompany specimens sent in by doctors. Reports are sent out on special forms for diphtheria, tuberculosis and the Wassermann reaction. For typhoid fever there is a particular blank and, in the event of a new case, an elaborate questionnaire. Bacillus carriers are made a matter of special record. For the rest there is what might be called a miscellaneous form.

If a positive finding of a contagious disease is made, the Kreisarzt is always informed, in addition to the doctor sending the specimen.

In filing records, in addition to usual methods, separate files are kept for the various Kreise.

An annual report is made to the Ministry of the Interior. During 1918 over 50,000 examinations were made.

Laboratory Methods: (*a*) *Tuberculosis.*—Sputa are stained routinely by Ziehl's method. Pappenheim's stain is sometimes used, also Much's. Negatives by Ziehl are antiforminized and the stain repeated. Complement-fixation test for tuberculosis is not considered valuable. Von Pirquet tests are not required of the laboratory. The director does private opsonic index work in tuberculosis.

(*b*) *Glanders* rarely is a subject of investigation. In addition to cultural diagnosis, the complement-fixation test is considered excellent.

(*c*) *Syphilis.*—For the primary or superficial lesion, the dark-field examination is the procedure of choice. Other procedures are the india-ink method, Gelinsa's stain or silver impregnation (Levaditi-Fontana). The complement-fixation test is the original method, using the extract of fetal syphilitic liver as an antigen. Two such antigens are used. The Lange test is done, but the director is skeptical as to its value. Provocative Wassermanns are occasionally called for.

(*d*) *Gonorrhea.*—The routine diagnosis is the Gram stain. Complement-fixation test is not employed. Vaccines are prepared.

(*e*) *Chancroid.*—Ducrey's bacillus is looked for in stained preparations.

(*f*) *Pneumonia.*—No typing is done. Vaccine prophylaxis is not used. To the director's knowledge, therapeutic sera are not employed.

(*g*) *Influenza.*—The director believes that the Pfeiffer bacillus is the cause. For culture, blood agar and "cooked" blood agar (Löwen-

thal's) is used. During the epidemic he recovered the Pfeiffer bacillus regularly. Vaccines have not been used.

(*h*) *Meningococcus.*—Type determination is not a routine procedure. The director thinks there are three types recognized in Germany. Ascites agar is the culture medium of choice. Only polyvalent therapeutic sera are used. There has been comparatively little meningitis in the last few years.

(*i*) *Typhoid.*—Blood culture methods are not given their proper value in the diagnosis of this disease, probably because of the difficulty of getting proper specimens through the mail. The Widal test is considered the most important instrument in the diagnosis of typhoid. The agglutination test is macroscopic, and the director has lately published an article claiming 100 per cent positive Widal reactions in typhoid bacillus carriers. For this test he uses strains of the bacillus in a mixture, and an incubation at 37° C. for as much as twenty-four hours, reading his results with a hand lens.

Stool and urine culture are excellently done, judging by results. Enrichment on malachite green agar plates is followed by plating on Endo or Conradi-Drygalski plates.

For water, if done, the ferric chloride precipitation is employed.

The vaccine is considered excellent as a prophylactic measure. It is not extensively employed in the civil population. The vaccine is a saline suspension. Lipo-vaccines are not used.

(*k*) *Paratyphoid fevers* are diagnosed by the same methods as typhoid. Beta type is the usual paratyphoid, the Alpha type being rare. There is no vaccine used for prophylaxis, the explanation being that the disease is so mild.

(*l*) *Dysentery.*—Culture on stool specimens arriving by mail yields poor results due to the time elapsing during shipment. The Conradi-Drygalski medium is considered best for this purpose. Widal test yields the most important diagnostic results, a mixture of several strains of one type being used. A vaccine has been used extensively in the military population. It is called "Dysbacta" and is a mixture of the various types of dysentery bacilli treated with the various immune sera, *i. e.*, it is a sensitized dysentery bacillus vaccine.

(*m*) *Cholera.*—The laboratory has had no occasion to work on cholera.

(*n*) *Typhus.*—There have been a few cases. The etiology is unknown. B. proteus agglutination test is considered absolutely specific.

(*o*) *Diphtheria.*—Material is sent in on swabs merely, *i. e.*, no culture media is used until the specimen reaches the laboratory. Direct smears and stains are then made and culture is done on plates. Alkaline methy-

lene blue is the preferred stain; the method of Neisser is also used.

(*p*) Diphtheria carriers, if children, are kept out of school. Other carriers cannot be controlled.

(Inquiries about pellagra brought the reply that there have been no casses beyond exceptional instances such as occurred before the war.)

Special work.—The director is interested in pathogenic moulds, microsporon and tricophyton. The chemistry division has worked on the nutritive value of a variety of cowpeas.

Histopathology.—Very little of this is done. A few gross pathology specimens were on exhibition.

Entomology.—The laboratory has dabbled a little in this subject. A few well-mounted specimens were shown.

Clinical chemical pathology.—Very little of this work is required of the laboratory. The little done is in the nature of private work. The examination of drugs is not made except to test their scientific value. The adulteration or misbranding of foods is not investigated, another laboratory having this as its function, the police medico-legal laboratory.

Located as it is in a great coal-mining district, the sanitary conditions of the mines receive special attention—smoke, dusty air and ventilation.

Discussion.—The institute is well housed and equipped. Its personnel is adequate in numbers, and capable. Its immediate location makes it rather inaccessible. As to methods, as might be expected in a public health laboratory, standard methods only are used. The institute differs very little in essentials from similar institutions of like size in America. The malachite-green enrichment method for the examination of stools for B. typhosus has a firm place in the laboratories here and, although employed in America also, deserves, perhaps, more extended use. (Brilliant green may be used for malachite green.) Another particular may be mentioned here again—the use of the diphtheria swab without culture media. But, in this instance, one is inclined to favor the usual American method. In general, it may be said that the laboratory meets the public health requirements for the particular situation.

[*Translation*]

Typhoid Memorandum

composed in the imperial health bureau

1. *Nature of the disease.*—Typhoid, also called abdominal typhoid, nerve fever, or pituitous fever, is a contagious disease, which is produced by the typhoid bacillus. Also many slight illnesses designated as gastric fever are true cases of typhoid.

2. *Course of the disease.*—The typhoid disease generally breaks out two or three weeks after the reception of the contagious material. As a rule it begins gradually with a headache, chills and fever, and temperature, as a result of which most patients must soon take to bed. At the same time excretions of bright yellow color occur, the fever mounts from day to day and reaches toward the end of the week of sickness 40° (Centigrade) or higher. The patient is tortured by great thirst, his tongue is coated, and, like his lips, dry; his sleep is troubled. In the second week, during which the fever usually remains equally high, there generally follows a considerable diminution in strength, and nervous symptoms such as stupor or delirious unrest appear. At this time there appear upon the breast, the stomach, often also on the upper thighs, scattered bright red spots resembling flea-bites, which disappear under pressure of the finger and reappear as soon as the pressure is removed. Seldom is lung catarrh absent; at times pneumonia occurs.

During the third week the fever begins to subside slowly and gradually and, when the course of the disease is favorable, the disease may be considered as over after the fourth week. Nevertheless, the convalescents need another month of rest for their complete recovery. In cases where the course of the disease is unfavorable, the fever remains continually high; the loss of strength and the unrest of the patient increase, and death follows in the course of four or five weeks. Especially bad complications may lead to death earlier. The mortality, which can be considerably decreased by proper treatment and care, varies between five and fifteen of every hundred patients.

3. *Treatment of the disease.*—There should be no delay in getting a physician at the earliest possible moment. Since the disease begins with an ulceration in the intestines, the patient must receive, during his sickness and convalescence, only such food as is prescribed by the physician. Mistakes in nourishment can increase the tendency to intestinal hemorrhages already present, and even lead to death through laceration of the intestines at the point of ulceration. The danger exists especially during recovery, when the patient begins to feel great hunger. A good bed for the patient is necessary in order to prevent bed-sores. As long as there is fever one should care for feeding and quenching of thirst according to minute prescriptions from the physician. Very often even severe cases owe their recovery to careful nursing. Such care is especially possible in hospitals; it is, therefore, in the interest of the patient himself that he be brought there as soon as possible.

4. *Transmission of the disease.*—The germ of infection is given off by the typhoid patient chiefly in his intestinal excretions and urine, at times, also, in his saliva, nose mucus and sputum (in coughing, sneezing

and vomiting). It is urgently advised that, in case of a typhoid suspect, specimens of his stool, urine, and if possible, his blood, should be sent to a bacteriological laboratory to determine the presence of the disease, and under certain conditions this should be done repeatedly. At times the excretions of the patient contain the material of infection a long time after recovery. Oftentimes people give off the material of infection, who have acquired the cause of the disease through contact with a typhoid patient or with infected objects, but who have not fallen ill themselves.

For transmission of the disease, mere traces of the exeretions suffice. If these reach underwear and bed-clothes, clothing, the floor, eating and drinking utensils, and in particular food, such as milk, vegetables, fruit, salad, they can easily be taken up by other people. Moreover, the material for infection can be spread, by water which, during the washing of eating and drinking utensils, has been tainted with the typhoid germ. Flies may also act as carriers. Transmission through dirty objects of use is all the more possible, because the patient passes his excretions not rarely while in an unconscious condition.

If the typhoid germ is transmitted in the immediate vicinity of the patient, the result is generally individual cases of the disease.

If, however, the germ reaches an article of food used commonly, such as drinking water or milk, masses may acquire the disease; indeed the consequence may be explosion-like outbreaks, with hundreds or thousands of cases.

5. *Isolation of the diseased.*—The treatment of a typhoid patient at home is only possible with the greatest difficulty, because of the great danger of infection. It is for this reason advisable to send the patient to a hospital as soon as possible. This is especially to be recommended where the dwelling is too small or where transmission to wider circles is to be feared, as in hotels, inns, bakeries, educational, welfare, criminal and similar institutions, schools, milk, vegetable and other food businesses.

If, however, in exceptional cases the transfer of a patient to a hospital is not possible, then he must be placed in a room isolated as far as possible from the rest of the house; all unnecessary intercourse with the patient is to be avoided. No one should visit a typhoid patient unless it is his duty. Children in particular should not be allowed near a typhoid patient, since, as experience shows, they become easily infected and carry the disease further by contact with other children. Children from houses or families where there are typhoid cases should therefore be kept from school and from intercourse with other children, especially in streets and public places.

Whoever has touched a typhoid patient, his clothes or bed, should wash his hands carefully with a liquid disinfectant (see No. 6).

For the prevention of transmission it is necessary that the sick room is furnished as simply as possible, and is gone over daily with a damp cloth. Carpets and curtains should preferably be removed.

In rooms where typhoid patients are found, one should never partake of food and should refrain from smoking, not only out of consideration for the patient but in one's own interest. Food and drink left over by the patient should be poured into the water-closet.

6. *Conduct of the nursing personnel.*—Those persons who care for or nurse typhoid patients should wear clothes which can be easily cleaned, or aprons which cover the entire front of the body and at all times maintain the greatest cleanliness. If they have touched the patient or his clothes, or have removed his excretions, they must brush their hands thoroughly with a sublimate solution or diluted cresol water and wash them about five minutes after with warm water and soap. For this purpose a basin of disinfecting fluid should stand ready in the sick room. They should be especially careful when bathing the patient; sprinkling about of the bathing water should be guarded against. They are most urgently warned against touching food with undisinfected and uncleaned hands, or putting objects to their mouths, which may have been tainted in the sick room, for example, eating and drinking dishes.

7. *Treatment of excretions.*—In the case of typhoid, disinfection at the sick bed is of especial importance. From the beginning of the disease to the end all excretions of the patient, as well as the objects used by him, must be continually disinfected. Typhoid patients should not use water-closets. Their excretions (stool, urine, vomiting) should be gathered in vessels easily cleaned, and may not be emptied in undisinfected condition in water-closets or on dung-heaps. They must first be made harmless by an equal amount of lime milk or diluted cresol water. Only after the mixture has stood for two hours may it be emptied into water-closet. Every spilling, as well as every befouling of floor, clothes, etc., even if it be with the smallest remnants of excretions, must be avoided carefully. The intestinal excretions and urine of typhoid patients must never be poured out in the neighborhood of wells or watercourses from which drinking water or water for use is taken; the emptied vessels may not be cleaned at these watering places.

The sputum also of the patient must be carefully gathered up and made harmless; the clothes should be placed for at least two hours in diluted cresol water before they are given out to be washed. For gathering up the sputum, wiping the mouth, nose and the like, muslin cloths can be used to the greatest advantage, which after use should be disinfected or burned. The washing and bathing water of typhoid patients may likewise cause infection. It must therefore be removed so that it cannot damage, and must not be emptied in the neighborhood

of, wells or watercourses. Before removal it is made harmless by mixture of chloride of lime milk. Enough of the latter is to be added to give the mixture a strong chlorine odor. The liquid may only be removed after two hours from the time of mixture with chloride of lime. With reference to water valves and sewerage pipes, the use of chloride of lime milk, clarified by being allowed to settle or by straining, is recommended.

Persons who, without being sick, give off typhoid bacilli (bacillus carriers) should ever bear in mind the especial danger which they are for their environment. They must, as in the case of the diseased, disinfect their excretions until the official physician declares on the basis of a bacteriological investigation that infection is no longer to be feared. As material for such investigations, specimens of stools for bacteriological investigations are sent from time to time to the proper places. Besides, bacillus carriers should disinfect their hands after every stool, or at least, wash them carefully with soap and water, because there is danger that otherwise the infectious material may be carried to food or other objects. The bed-clothes and underwear of the bacillus carrier should also be disinfected.

8. *Treatment of linen clothing and utensils.*—Bed-linen and underwear, clothes used for cleaning the patient and washable clothes should be placed in vessels with diluted cresol water. They must be completely covered with this liquid and may be cleaned only after two hours. Pieces of clothing which are not washable are, if possible, to be disinfected by steam in a disinfecting establishment; if this is impracticable they should be brushed with diluted cresol water. The patient should have his own eating and drinking dishes, which are to remain in the sickroom and be cleaned there. Before they are used by others they must be boiled for fifteen minutes in water, to which soda may be added.

9. *Disinfection of the house.*—Dirty parts of the floor or the sick room are to be covered at once with diluted cresol water or a sublimate solution and mopped up after one hour.

After the patient has been transferred to the hospital or to some other suitable place, as well as after his complete recovery or death, the sick rooms and all other rooms used by the patient, together with their contents, are to be thoroughly disinfected according to the physician's directions, preferably by means of proven disinfectants. Special care in disinfecting is to be shown in hotels, inns, educational, welfare, criminal and similar institutions, as well as on ships.

10. *Handling of food.*—The preparation, preservation and sale of food near where there are typhoid patients may under no circumstances

be permitted. Bacillus carriers may not be engaged in obtaining, preparing or selling food.

During an epidemic, the use of water, milk, fruit, or vegetables in an uncooked state is by all means to be discouraged.

11. *Transportation of typhoid patients.*—Typhoid patients are to be transported, if possible, in ambulances. Public conveyances (carriages, street cars and the like) should not be used. If this occurs in exceptional cases, thorough disinfection must follow immediately.

Infection may also come from typhoid corpses. They should be taken as soon as possible from the house where the death occurred to a corpse-room, or, if there is none, to an isolated room that can be locked. Setting out the corpse in an open coffin, handling in the house where the death occurred, etc., are dangerous and, therefore, forbidden.

Remarks.—As disinfectants, are recommended:

1. Diluted cresol water (2.5 per cent). For producing it are used either 50 c. c. (*i.e.*, 3 or 4 tablespoons) of creosol soap solution (liquor Cresoli Saponatus of the Medicine Book for the German Empire) or ½ liter of creosol water (aqua cresolica) mixed with ½ liter of water, making a liter of disinfecting fluid.

2. Sublimate solution (1/10 per cent). For producing it either one tablet of one gram or two tablets of ½ gram each of the purchasable pink sublimate tablets (Pastilli Hydrargyri bichloride) are dissolved in 1 liter of water.

3. Lime milk. Freshly burnt lime is placed undiminished in size into a roomy vessel and is sprinkled evenly with water (about half the quantity of the lime); it thereupon dissolves amidst considerable heat and expansion into lime powder.

The lime milk is prepared by gradually adding 3 liters of water to each liter of lime powder, stirring the mixture all the time.

If freshly burnt lime is not at hand, the lime milk can be produced by mixing 3 liters of water with each liter of slack lime as it is found in a lime pit. In these cases, however, care must be taken that the upper layer of lime affected by the influence of the air is removed.

The lime milk is to be stirred or turned over before using.

4. Chloride of lime milk is made of chloride of lime (calaria chlorate) which has been preserved in airtight barrels, protected from light, and which should possess a sharp chlorine odor. To each liter of chloride of lime 5 liters of water are gradually added, while the mixture is continually stirred. Chloride of lime milk is to be prepared each time before using.

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Besides this there have appeared: Alcohol memorandum, cholera memorandum., dysentery memo., diphtheria memo., tuberculosis memo., lead memo., memo. for workingmen in Chrom-tanneries, memo. for file cutters, memo for grinders, tapeworm and trichinosis memo., gadfly memo., memo. concerning the premature removal of calves from cows (price of these memos. 5 Pfg. each), mushroom memo., milk memo., domestic animal parasites memo. (price of these memos. 10 Pfg. each).

WAR DERMATOLOGY IN FRANCE AND THE PREVENTIVE MEASURES TAKEN

By Lieutenant Colonel FRANK CROZER KNOWLES, M.R.C., U.S.A.
Consultant in Dermatology, American Expeditionary Force

(*Concluded*)

DISINFESTATION

WHILE there are a considerable number of different methods by which lice, nits and the parasites of scabies can be destroyed, the general consensus of opinion is that for large scale disinfestation, such as is necessary in an army, heat is to be preferred to fumigation, immersion, or other chemical methods. Heat may be applied as steam or as dry heat, and it seems likely that it will be necessary to make use of both of these forms of heat, adapting the method to the conditions and the locality.

Moist Heat.—The Foden-Thresh and similar mobile steam disinfectors can be used to great advantage in the sterilization of clothing, blankets, etc., at baths and laundries where hot air chambers are either in the course of construction or permanently unavailable. They will form an important mobile emergency apparatus for isolated units and temporary camps. Several machines of this type or of the trailer variety are now being made by the Geneste-Herscher Co. (French), the Grampian Engineering Co. (English), and the American Sterilizing Co.

Two very compact outfits are manufactured by the Geneste-Herscher Co. The camion carries sufficient tentage and equipment for a complete bathing establishment, and the trailer in one instance carried heater and boiler for baths, while in the other a disinfestation outfit was also present. Most of these machines have a capacity of handling from seventy-five to one hundred blankets at a time or an equivalent number of suits of underclothing.

The wooden steam chambers with perforated and unperforated pipes are probably the best form for the treatment of underclothing at laundries and blankets at large permanent stations in the area of the rear, since they can be constructed for any required capacity, are simple in operation, and kill bacteria as well as vermin.

Dry Heat.—Dry heat is being employed chiefly by means of the so-called Jacobs hot-air chamber.

CHEMICAL DISINFECTANTS

Numerous chemical substances have been suggested for the killing of lice. Bacot has carried out extensive experimentation along this line, and we will depend largely upon his findings for our deductions. Cys-

tisine, at the suggestion of Dr. H. H. Dale, was tried; this preparation is an alkaloid showing similar physiological properties to those of nicotine, but much less volatile. It is extracted from the seeds of gorse and laburnum. This preparation, although quite satisfactory from an experimental point of view, has two apparently unsurmountable difficulties which prevent its use as a practical remedy. First, its possible toxic effect if used to impregnate garments, and, second, the high cost of production. The other preparations which this experimenter tried were flowers of sulphur dissolved in carbon bisulphide, the solution containing 15 per cent of sulphur and having no great lethal action on lice. Vermijelli had practically no effect on the louse. Cresylic acid was only partially effective. The net result of the various trials show that the diffuse effects of all substances, except possibly naphthalin is so slight as to reduce them all to a common level of contact remedies. Naphthalin, used as a powder, is likely to be wasted. If used in a form in which garments can be impregnated with it, it is an almost perfect remedy, as it kills quickly, and when there is any risk of infection is probably the best means available. The chief objection is its rapid evaporation; by the second day after impregnation of shirting its power has either waned or has already departed.

Bacot found, however, an extremely effective remedy in the killing of lice was an emulsion consisting of equal parts of soft soap and crude liquid carbolic acid (the suppliers state that the fluid consists chiefly of cresols with a little phenol and a certain proportion of higher homologues). This emulsion, as finally devised by Bacot, consists of 45 to 50 per cent of soft soap, combined by heating with 50 to 55 per cent of crude carbolic; a 5 per cent solution of this emulsion in warm water is the proper strength. The underclothes and flannel shirt are placed in a tub of this preparation and then wrung out. A normal sized flannel shirt will retain, after wringing, between 500 and 600 c.c. of the mixture. The preparation costs approximately one penny per garment. This preparation, according to the experiments, is effective in the eradication of lice for seven to eight days after its application. Maj. Kenneth Taylor and his assistants (No. 2 Red Cross Hospital) wore garments impregnated with this emulsion for several weeks without irritation to the skin.

Gunn advises that the bodies of the soldiers should be bathed with gasoline containing 1 per cent sulphur and 1 per cent naphthalin, and their clothes dipped in the same solution. This solution, and also the N. C. I. powder, are undoubtedly effective, but should be employed every second or third day. This N. C. I. (naphthalin 96 per cent, creosote 2 per cent, iodoform 2 per cent) powder depends for its letha

properties on the naphthalin, the iodoform making it more adherent and hence more efficacious. Commercial naphthalin is much more efficient than the chemically pure product. The attached chart will show clearly what an effect this powder has in reducing lousiness.

Date	Place	Organization	Strength	No. men exam.	Pedic	Scabies	Remarks
1918							
6–29	Entree des-Eaus.	Co. H., 60th Inf.	230	166	29	18	Just out of trenches after 12 days.
6–29	Entree des-Eaus.	Co. F, 60th Inf.	.....	122	26	9	Do.
6–29	Maudray	Co. G., 60th Inf.	.....	161	32	9	
6–30	Maudray	Hdqrs. Co.....	.....	22	4	1	
6–30	LeTholy..	Co. E, 7th Engrs.	216	208	15	3	
6–30	LeTholy..	Med. Detachment	13	13	3	0	
7–3	LaCollet..	Co. A, 15 M.G. Bn.	.....	160	20%	0	
7–6	Ardies....	Co. A, 61st Inf.	176	170	2%	0	Been using N.C.I. pulv.
7–6	Ardies	Co. B, 61st Inf...	198	190	5%	1%	In line 19 days. No bath.
7–6	Ardies....	Co. C, 61st Inf...	197	188	30%	1%	Do.
7–6	Ardies....	Co. D, 61st Inf...	193	185	2%	0	N.C.I. pulv.
7–6	Ardies....	Co. L, 61st Inf...	176	160	30%	1%	Just out of line 19 days.
7–12	Vignal....	Cos. A, C, D.....	.....	80	6%	0	In line.
7–12	Paris.....	.....	.....	70	2%	0	In line.
	Corcieux	Fd. Hospital.....	80	79	0	0	15 Tinea Cruris.

The French Army, at the advice of the Pasteur Institute, has adopted an anti-louse device, consisting of pieces of cloth worn as a scapular on the chest and back; the cloth is moistened with a lotion consisting of three parts each of essence of Indian Verbena, essence of pennyroyal, essence of eucalyptus and one part of naphthalin. They are moistened every four days and are said to keep the men practically free from lice.

Bacot and Lloyd have recently carried out some interesting experiments. "Destruction of nits of the clothes louse by solutions of creosol soap emulsion and lysol." The evidence as a whole seems to establish the fact that steeping for twenty minutes in a 2 per cent solution, either lysol or the cresol soap, is quite effective provided the temperature is not below 50° F.

It will prove instructive to give in some detail the manner of delousing and bathing as employed in the French and American Armies.

PORTABLE DELOUSING AND BATHING STATIONS IN USE BY FRENCH ARMY

These stations are distributed along the entire French front, two to a corps. They are admirably fitted for disinfestation and bathing.

They are located usually in the rest area, but far enough forward so as to be accessible to the troops in reserve areas as well.

Men are sent to the baths in groups of fifty every forty-five minutes. Upon arrival they are taken in groups of twenty-five every twenty or twenty-five minutes.

These men are taken into room No. 1 where they are stripped; khaki and overcoats are passed into disinfecting chamber (No. 4), where they are exposed to free steam for ten minutes and dry heat at 115° C. for twenty minutes. During this process men are passed into room No. 2, where they are thoroughly bathed for twenty minutes. They then pass to room 3, where a change of underclothing is supplied, and they receive the deloused garments from the chamber into room No. 3.

This station is used principally as a bath, as they do not delouse clothing as a routine, only taking, for delousing, the clothing of men known to have lice. In this way they can increase the number of men for baths to about 600 per day. Where every garment is passed through the steam chamber only about 300 can be handled daily.

This is an ideal bathing and delousing plant, being made in a double walled canvas hut 50 by 35 feet made into sections that can be moved very easily. Floors are of wood and in sections. The steam disinfector is on a truck, as is the furnace and steam boiler; on top of the disinfecting chamber is a 100-gallon tank in which the hot water from the steam boiler is mixed with cold water, for the bathing showers. The furnace uses about 600 kilos of coal on the busiest days but generally only about one-half this amount is necessary.

The personnel required to operate this plant is usually about ten men, but may be increased where it is necessary to carry water any distance. If possible, they are located near a stream where a pump can be installed to furnish water. Steam from the disinfector's boiler operates this pump.

The French claim that one bath per week is sufficient to keep a man free from lice. At present the men get two baths during the nine days they are at rest, but none while in the line nine days or in support nine days. This can be handled very easily if one of these stations can be sent far enough forward to bathe the men in support.

Captain MacGruer, dermatologist, reports as follows on the method employed in the 26th Division, A. E. F., in delousing and bathing:

May 6, 1918.—Spent this day with Lieut. Sprague, sanitary officer. We first visited bathing and delousing station No. 3 near Boucq. This establishment was given by the American Red Cross and consists of two small tortoise tents in which the clean and soiled clothes are kept; one Bassoneau tent in which personnel live and

for men who are sent to bathe to lounge while waiting turn in bath—also contains a barber shop. The bath tent is arranged so that men enter at one end of tent where there are nine benches with two numbers on each side of bench, total 36. The soldier undresses and puts his clothing in a large net bag on which is a numbered tag; he also receives a small bag in which he places his valuables. He then enters shower room at each end of which there are open lockers in which he places his bag of personal belongings and also shoes. After bathing he enters room at other end of tent, and at seat with corresponding number of seat in first room finds his clothing which has been disinfected, or else is given a new outfit. This bath has twenty shower heads so that forty men can bathe at the same time. Large Geneste-Herscher disinfector which opens into bath, undressing and dressing rooms, fired from outside building. This bathing and delousing station is centrally located for the division, accessible to nearly every unit. It is kept up in good shape, clean, and personnel very interested in work. Lieutenant Sprague, by using trucks and with thirty men in truck, for transporting men just out of trenches, put 600 through in one day. Capacity is at least 1,200 a day. Lieutenant Sprague is also accumulating clothing at this station and will receive about 5,000 suits for distribution here. Old clothing to be disinfected, laundered and returned for reissue. Personnel bathe and delouse every other day. Ordinarily men given eight minutes to undress, four minutes to bathe and eight minutes to redress. With hot air applied to clothing after steam disinfection and clothing shaken out in air they are nearly dry.

It has been the aim of the department to establish methods of prevention against the louse by having in each brigade of every division a large bathing and disinfesting establishment where the men are brought by organizations, not part of organizations, at least once each week, when not in the line. A commissioned officer accompanies each organization to the bath for the purpose of maintaining discipline. Each soldier brings with him his blanket and such equipment as can be disinfested by steam. At the bath all of his clothes are disinfested and the man receives a shower bath of hot water and soap. He receives a clean suit of underwear and socks, and also clothing if his other clothes are torn or unfit for use. His soiled, disinfested clothing is laundried and returned to the bath house for reissue. It is also being arranged to have a trained sergeant at each such establishment to differentiate scabies and pediculosis so that every soldier with scabies or severe skin lesions, such as the pyodermias, will be sent to the division skin hospital for appropriate treatment.

Frequent Skin Inspections.—Inspections of this character are absolutely essential, chiefly to detect scabies and lice within a few days after their development. Inspection of the skin should be painstakingly carried out at each bi-monthly venereal examination. For a thorough examination in this regard, the shirt should be raised to the shoulders and the trousers dropped to the knees. By this method the parasitic skin diseases can be discovered in their incipiency and rapid cure may be effected.

Parasitic skin diseases should be reportable, the same as venereal conditions, so that exact account may be kept, which, and in what manner, various organizations have fallen down in their prophylaxis measures.

The success of this department in the prevention of skin diseases is largely due to the excellent General Orders which have been issued: G. O. 34 dealing with prevention, G. O. 38 in reference to bath houses, G. O. 13 dealing with laundries and clean clothes, and G. O. 215 regarding the holding of venereal cases in France and a physical examination for lice and scabies.

FRANCE, *September* 17, 1917.

General Orders,

No. 38.

2. Bath Houses. A bath house approximately 26 x 22 feet with a concrete floor, containing a dressing room and a bath room with from eight to twelve shower heads is authorized together with the necessary arrangements for heating the same, for each battalion area.

FRANCE, *January* 21, 1918.

General Orders,

No. 13.

1. The Quartermaster Corps will provide and operate laundries to do such laundry work as may be essential for troops in the Zone of the Advance and for patients in hospitals wherever located, including nurses' and doctors' caps and aprons. This work will be done without charge.

2. All garments laundered will be sterilized, washed, repaired and re-issued, no attempt being made to return to the soldier the identical garment he turned in.

3. Complete outfits of clean clothing will be issued to front line troops after leaving the trenches, and using the bathing facilities authorized by G. O. 38, H. A. E. F., 1917.

4. No laundry work will be done for troops not serving in the Zone of Advance.

5. Organizations moving into the Zone of Advance will take with them their portable shower baths, to be installed in suitable shelters, with the least possible delay after arrival. Engineer troops when available should make the necessary installation.

FRANCE, *November* 25, 1918.

General Orders,

No. 215.

1. Officers and enlisted men returning to the United States will be subjected to a physical examination previous to embarkation, and all those found to be affected with venereal disease in a communicable stage will be detained and placed in segregation camps.

In concluding this report I wish to pay a tribute to the senior consultant of the department, Col. Hugh H. Young, and to Col. Edward L. Keyes, Jr., consultant in urology. This department was started under peculiarly trying circumstances, organization being required in a strange land for a constantly growing army. Colonels Young and Keyes have striven early and late, and their enthusiasm has been an incentive for all those in the department.

Conclusions.—The Section of Urology of the American Expeditionary Force has had charge of one of the greatest problems of the war.

War skin conditions differ from those in civil life in the difference in distribution of the eruption of scabies; the fact that the body louse lays its eggs on the axillary, pubic and perineal hairs, in addition to the usual sites; the severity of the complications of the animal parasitic conditions; the unusual types of impetigo and ecthyma; and the prevalence of flea-bites.

It has been estimated that animal parasites caused between 80 per cent and 90 per cent of all diseases in the various field armies. According to a conservative estimate, 95 per cent of the soldiers who had been at the front for six months or more showed lice.

Percentage figures on scabies show tremendous variations.

Divisions of the American Expeditionary Force, in active fighting, rarely showed more than 1 or 2 per cent of scabies, and frequently considerably less.

Approximately 40 per cent of all skin cases requiring treatment in the A. E. F. were diagnosed as scabies.

Scabies, if discovered within three weeks after its onset, can be cured in a maximum of four days. If scabies, or pediculosis, is allowed to go untreated for a longer period than three weeks, secondary complications, such as the various pyodermias, develop and cure will take a minimum of one month.

Pyodermia in the A. E. F. was held to a minimum of cases; there were but few requiring hospitalization. This contrasted tremendously with the records of our allies, who had thousands of hospitalized pyodermic infections. It should be stated, however, that preventive measures instituted in the A. E. F., were unusually effective for several reasons.

1. The U. S. soldier was fresh in the struggle and had not been worn down by four years of trench life.

2. The resistance to organisms was at the highest possible point.

3. The digestive apparatus, including the mouth, was in excellent condition, likewise raising the resistance to disease.

4. The mud of Flanders, containing large numbers of the streptococcus foecalis, was not a contending factor.

5. The American Army as a whole fought in a war of movement and was not subjected to the resistance-lowering winters in the trenches.

The solution of the problem is disinfestation of clothing and blankets, bathing, chemical repellants, laundries, and frequent skin inspections.

A minimum of two disinfectors and bathing machines of the Foden-Thresh or Geneste-Herscher type are necessary for each division. The mobile disinfestor, manufactured by the American Sterilizer Co., is applicable for the use of base and camp hospitals.

The dry-heat apparatus, designed by Jacobs, is an adjunct to the other disinfestors for the delousing of perishable articles, such as leather and rubber goods. This apparatus is chiefly practical in non-mobile units or in areas permanently occupied.

The N. C. I. (naphthalin, creosote, iodoform) powder certainly assisted in the eradication of lice when freely and frequently employed.

Bi-monthly skin inspections are essential so as to detect animal parasitic disease in its incipiency.

The examination for venereal and parasitic diseases, every fifth day, at the embarkation camps in France should have had an excellent influence in guarding against a tremendous influx of these cases into the United States.

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METHOD OF HANDLING VENEREAL DISEASES AT CAMP DIX, N. J.

By Captain CHARLES H. deT. SHIVERS, M. C., U. S. A.
Chief of the Urological Department, Camp Dix, N. J.

(Concluded)

PASTED on the wall of each treatment room are rules to be followed in regard to sterilization; and during all our thousands of treatments we have no record of being responsible for the extension of infection due to unclean instruments. The rules for sterilization in this department are as follows:

No. 1. Officers in this department must not allow their orderlies to carry out the treatments.

No. 2. In each treatment room there must be four white enameled basins, one containing cold sterile water, one on the sterilizer with boiling water, one with a solution of mercury cyanide 1–5000, and the other a solution of bichloride 1–5000.

No. 3. Soft rubber catheters must be boiled for ten minutes (several will be in use at one time), they must be taken from the boiling water with sterile thumb forceps and placed in cold sterile water until used.

No. 4. Soft rubber catheters for use are to be taken from the cold sterile water with sterile thumb forceps and, while holding the end of the catheter with the forceps, it should be run through the lubricant. The assistant washes the patient's glans penis with a 1–5000 bichloride solution and wraps a towel soaked in the same solution about the scrotum and shaft of the penis; the end of the catheter is then introduced into the meatus. Catheters are to be touched with the fingers as little as possible. All posterior treatments must be preceded by anterior irrigation. The metal urethral nozzles used for anterior and through-and-through irrigations must be kept in boiling water, then placed in cold sterile water before using.

No. 5. Hard rubber or woven catheters must remain in the mercury cyanide solution all through the treatment hours and, when used, they will be removed by the thumb forceps and used as are the soft catheters.

No. 6. In the basin containing the bichloride solution there will be cotton and gauze for wiping off the glans penis, etc.

No. 7. Officers will wear white gowns and rubber gloves at all times. These gloves will be boiled each evening for ten minutes and during the treatment hours will be soaked in a bichloride solution 1–5000.

No. 8. After massaging the prostate and vesicles, finger cots are to be wiped off with tissue paper, removed from the finger and handed to an orderly in charge of the sterilization, who will place them in boiling water for five minutes and from there to a 1–5000 bichloride solution where they will remain until used. A large number of finger cots will be in use at one time to allow proper sterilization.

No. 9. Lubricant will be placed on sterile gauze in each treatment room. The officers and enlisted men are not to bring their hands in contact with this lubricant (for use with catheters and sounds only). Sterile vaseline will be used to lubricate the fingers when prostatic or vesicular smears are called for. This lubricant will also be placed on a piece of sterile gauze.

No. 10. Hard rubber or woven catheters are to be used only when it is impossible

to pass a soft catheter through the compressor urethrae muscle as the result of spasm.

No. 11. All metal instruments will be boiled for ten minutes before using.

No. 12. Instruments injured by boiling will remain in a 1–20 carbolic solution for one half-hour. They will then be put in a 95 per cent solution of alcohol and thoroughly rinsed, from here the instruments are placed in a 1–5000 mercury cyanide solution where they remain until used.

No. 13. There will be an orderly assigned to each treatment room who will do nothing but attend to the sterilization. His hands must be washed at frequent intervals, he must wear a white gown and rubber gloves, and these gloves will be sterilized as explained above.

No. 14. All officers examining new cases must sterilize their gloves in a 1–5000 bichloride solution between each patient. The parts are not to be handled unnecessarily; the patient is to retract his own foreskin and make pressure on his own urethra.

The cystoscopic work is done in the afternoon. At times we have a large number of cases reporting for this work. We require as indications for cystoscopic examinations: (1) Nocturnal incontinence (2) hematuria, (3) passage of calculi, (4) chronic pain referable to the genito-urinary tract, (5) frequency, (6) persistent cloudy urine, (7) loss of or impaired sexual powers, (8) painful or bloody ejaculations.

A great many cases are sent to this department who give a history of enuresis from childhood. As a rule these soldiers are light complexioned, and their history will show that there may be one or two in their immediate family suffering from the same condition. Most of their relatives thus affected are males. On cystoscopic examination about 75 per cent of these cases will show a trabeculated bladder, running from a slight condition to marked trabeculation with false diverticuli. The trigone is elevated and the bladder as a rule contracted, depending of course upon the extent of involvement. The other 25 per cent, giving a history of enuresis, have, on cystoscopic examination, normal bladders. In none of these cases did we find any obstruction in the urethra. Their bladder muscle hypertrophy may be due either to the frequent emptying, or the muscles controlling the neck of the bladder may not act in accord with those composing the rest of the organ. We have on record one case of enuresis that did not exist from childhood, nor does it date back to any gonorrheal infection. This is in a young man twenty years of age who gives a history of nocturnal incontinence dating back fourteen months. Prior to that time his history was absolutely negative, frequency of urination being first noted when he was ordered to the front line trenches; and the condition has existed since that time. At present he urinates every little while and wets the bed most every night. The cystoscopic examination showed a markedly trabeculated bladder, especially on the posterior wall and just above the trigone. The bladder

was also contracted holding only 200 c.c. of fluid, otherwise his physical examination was negative. There was no notation on his service record of "shell shock." This case is of interest if we can believe his previous history, as it shows a possibility of frequency of micturition playing a part in bladder muscle hypertrophy. Very little is known about the etiology of these cases. It is possible in this case, as in the others, that the muscles controlling the neck of the bladder do not completely relax as the body muscles contract, thereby causing obstruction to the outflow of urine, which the bladder must overcome when emptying. None of these cases had spinal syphilis. But in any event there may be a cord lesion. We have also found in our work several cases of renal and vesicle calculi, some benign growths of the bladder (papilloma), and a few cases of renal and bladder tuberculosis.

We took for a matter of experiment 200 cases of chronic recurring gonorrhea which gave a history at one time or another of frequency of urination and cystoscoped them before they were discharged from this department. We found in some an active trigonitis; in other cases the trigone showed the result of an old chronic infection. The percentage of those involved amounted to 33.09 per cent. There have been a few cases in which we were able to demonstrate that the trigone was the cause of the recurrence.

It has been a subject of dispute among physicians as to how long cases suffering from acute and chronic gonorrhea should be kept under treatment, and what should be demanded of them before a cure is pronounced. We had the opportunity of studying 1,000 chronic cases showing prostatic and vesicular involvement, using the Gon. Comp. Fix. Test as a guide. We found this test would become negative from six to eight weeks following the disappearance of the organism from the smear. The gonorrheal anti-bodies are supposed to disappear from the blood in two to six weeks after the destruction of the organism. Following this observation we made it a rule to require in these cases of deep infection six negative prostatic and vesicular smears with not more than five pus cells to the field in the last three smears, also running up to a suitable size sound to express the content of the urethral glands and to act as a mechanical therapeusis whereby old inflammatory infiltrations are made to disappear through a reaction in the tissues.

It is interesting to note the result of gonorrheal infection in the Florida negro. We had the opportunity of studying 2,000 of these cases. The history of the infection generally dates back to the time they were first able to have sexual intercourse. We found in a great many of these cases the result of a Neisserian infection and were able to demonstrate the intracellular organism in a lower percentage of cases than in the

corresponding infections in the white man. This type of negro seems to possess some natural immunity, as his infection is never as acute as the white man's. On examining the prostate we find that organ to be smaller and the vesicles larger than the white man's. The vesicles in the negro are more often involved in gonorrheal infections; he also suffers more with rheumatism than the white man. We find more strictures in this same class of cases, the large majority of these soldiers never having received any kind of treatment before coming to this camp. The strictures are multiple and were found 2½ inches from the meatus, or in the bulbo membranous urethra. There is fear existing among some physicians that the passage of sounds in cases of chronic gonorrhea is a bad practice on account of traumatising the urethra with the formation of a stricture. This is incorrect, as we found that a sound properly passed at the correct time did not in any case injure the urethra.

In the early stage of gonorrheal joint involvement we find an acute synovitis, and it is during this stage that the most good can be done for our patients. We found the majority of these cases were suffering from chronic gonorrheal vesiculitis plus prostatitis. We have noticed soldiers coming from other camps with joint involvement who had been under the vaccine treatment with very poor results. We feel that the condition in the joint is due more to the action of toxins than to the presence of the actual organism. Cases have been noted that have had free urethral discharges for months, with vesicular involvement and acute joint conditions. They had been under treatment in the base hospital, splints had been applied to the joints, and anterior irrigations given. Posterior treatments were avoided on account of a copious urethral discharge for fear of additional acute complications. We took some of these cases that had been existing for several months, kept them in quarters and gave them through-and-through irrigations twice a week with silver proteinate one-half per cent solution and light vesicular, and prostatic massage. Our results in most of these cases were excellent, the joint conditions clearing up in a few weeks time, showing the importance in all cases of gonorrheal joint involvement of first clearing up the foci of infection. It is possible that vaccines do good in certain selected cases, especially if the right strain is used. The cases showing chronic joint involvement of long standing we could do very little or nothing for, because we were dealing with end pathology of permanent changes in the joint.

Most of the cases of gonorrhea we have had to deal with in the army were of a number of years standing; some had as high as five or six separate attacks. It was interesting to note in going over their histories how few of these cases had received the proper treatment in civilian

life, even those who really expressed a desire to be cured. Their treatment had consisted mostly of anterior irrigations, internal medication or through-and-through irrigation of the urethra alone. It was surprising to see how few cases with prostatic involvement had received the proper treatment; approximately one case in every five hundred. A great many of these infections were claimed to have been cured in the anterior urethra. We have seen in this camp a great many thousand cases, both at the base hospital and in the camp department, but have not seen one case where we can prove the gonorrheal infection has been confined to the anterior urethra; and most of the cases that had been apparently cured by doctors in civilian life in the anterior urethra we were treating after they entered the army. Mention might be made here of the relation of recurring gonorrhea as acute exacerbations to the taking of the typhoid inoculation, especially when it was given in a saline medium where the absorption was rapid. We have also seen a considerable number of peri-urethral abscesses following the typhoid inoculation, showing the urethral glands had been involved and an overgrowth of epithelium had blocked the outlet, and by some action of the typhoid vaccine the organism had been stimulated to renewed activity. Another thing of interest in those cases that were confined to their beds in the base hospital is that we found some that would develop epididymitis while flat on their backs and on a milk diet. Other cases of urethral discharge would be prolonged over a long period. We watched these cases very carefully and found that a number of them were chronic masturbators, by this causing a continued congestion of the parts which predisposed to further invasion. Statements have been made that it is unnecessary to treat the prostate unless the patient suffered from subjective symptoms which pointed to involvement of that organ. We found gonococci intracellular in quite a few prostates where the patients had absolutely no subjective symptoms. It seems almost impossible to have involvement of the prostatic urethra without having some infection extending to the prostate, as there are from forty to sixty prostatic ducts situated in the prostatic sinus on either side of the verumontanum. The infection extends, involving the neck of the bladder, and in many more cases than was formally supposed the trigone is involved.

It takes approximately three months before we can discharge our acute cases as cured. The acute cases report to this department once a day for a copious anterior irrigation. In the early stage of the disease they are given five minims of sandalwood oil three times a day, and during the declining stage copaiba and urotropin. Smears are made from their urethral discharge twice a week. Their subjective symptoms are carefully noted each day when they report for treatment. If the burning

on urination increases we decrease the strength of the solution; if, on the other hand, the number of pus cells and organisms increase, as shown by the smears, we increase the strength of the solution, providing the subjective symptoms do not contraindicate its use. When the organisms become extra-cellular, the pus cells decrease in number with an increase of the epithelial cells, showing that the healing process is going on. Then we give the patient solution "4," which is an astringent consisting of two grains each of copper and zinc sulphide in 8 ounces of water, which he is instructed to inject into the anterior urethra three times a day, following urination, and to hold it there for five or ten minutes. He reports as usual for his silver irrigation to destroy the remaining gonococci (it is better in the acute cases to allow the patient to inject a silver solution in the anterior urethra following each urination, besides his daily copious irrigation. This we could not satisfactorily carry out in camp because a great many of the patients would fail to take their injections). At the end of the fourth week, providing the patient is doing nicely, we start our through-and-through irrigation twice a week. The prostate and vesicles are never examined in these cases before the sixth week, sounds are never passed until the discharge and urines clear up, which averages about six weeks. If the patient shows prostatic involvement at the end of the sixth week, we require six negative prostatic smears and pass suitable size sounds before we discharge the patient as cured. One vesicular smear is made in the early stage of the posterior treatment, and if that is negative the vesicles are not examined again until just a week before the patient is discharged. This second examination is to assure us that the vesicles have not been involved during the latter part of the infection. If they show infection, we require the same number of negative smears as we do from the prostate. All massages are followed by copious irrigations of the entire urethra; all sounds are preceded by irrigation of the urethra, filling up the bladder with a silver solution, which the patient passes following the administration of the sound.

It takes on an average of ten weeks to clean up a case of acute exacerbation of chronic gonorrhea, providing the vesicles are not involved. These cases receive copious anterior irrigations for at least two weeks before the through-and-through treatments are started. The examination and treatment of the prostate and vesicles are begun at the end of the fourth week, providing there are no contraindications. Chronic gonorrhea, with involvement of the posterior urethra and prostate, takes from eight to nine weeks to cure. Posterior treatments twice a week are started immediately, giving one treatment of sounds and irrigation, and the other of prostatic massage with irrigation. The same number of

negative smears are required before discharging these cases. Patients with posterior urethritis of long duration do best on instillations of a 1 to 2 per cent solution of silver nitrate to the posterior urethra once a week. The Kollmann posterior dilator is of great value in those cases, showing submucus infiltration. Local application through the endoscope also does good in these chronic cases. Instillations once a week of a 1 to 10 per cent solution of silver nitrate to the trigone of the bladder is the treatment of most value in gonorrheal trigonitis.

We found the following drugs of almost equal value in the treatment of acute gonorrheal urethritis: (1) Silver protinate, ½ of 1 per cent solution, (2) potassium permanganate, 1–5000, and a new preparation recently put out by the Polyclinic Hospital Laboratories of Philadelphia called mercurophen, which is known chemically as "Sodium Oxy-Mercury Ortho-Nitro Phenolate" containing 53 per cent of mercury. Probably the last-named product is superior in its germicidal effect to the other two drugs. There seems to be a more rapid decrease in the number of pus cells and an earlier disappearance of the gonococci from the cells when it is used. In chronic gonorrhea we have used mostly the silver protinate ½ per cent solution; also silver nitrate 1–10000, and the mercurophen 1–5000. The silver protinate and the mercurophen cause less irritation than the silver nitrate, and the end result apparently is just as effective. The mercurophen does not coagulate the albumin in the tissues except to a very minute degree, therefore its irritative properties are very slight.

From June 24, 1918, until February 1, 1919, the records of this department show the following number of cases examined and treated for each month, with the percentage of complications:

	No. cases examined	*No. of treatments given*	*Per cent of complication*
July	1,041	2,526	0
August	2,909	6,655	5/100 of 1%
September	2,606	13,195	11/100 of 1%
October	2,891	23,085	5/100 of 1%
November	2,061	19,775	4/100 of 1%
December	338	2,364	16/100 of 1%
January	178	1,511	13/100 of 1%
	12,024	69,101	

The majority of complications were cases of acute epididymitis. I have not seen one case in this camp of acute prostatic infection that did not respond to palliative treatment, nor have I seen a case of ruptured prostatic abscess.

The following are monthly reports from our laboratories, with a grand total for the seven months, including urethral, prostatic and vesicular smears, urine analysis, and animal inoculations:

July, 1918	2,035 reports
August, 1918	5,385 reports
September, 1918	7,713 reports
October, 1918	13,604 reports
November, 1918	14,665 reports
December, 1918	1,743 reports
January, 1918	758 reports
Total	43,903 reports

We have in the Camp Urological Department 115 enlisted men. There is one first-class sergeant in charge of these soldiers, and a sergeant or corporal at the head of each building acting under his orders. The enlisted men work as clerks, assistants, orderlies, traffic policemen. and guards. Each physician is assigned one or two of these men to help with his work. The buildings are never closed, and two enlisted men are on duty in each building throughout the night. The hours of work are from 7.30 a.m. to 4.30 p.m., although they have often been kept much longer than that during the busy months.

There are 24 officers on duty in this department. A captain is in charge on each building who is directly responsible to the chief of the department, and has as his assistants either captains or first lieutenants. The hours of duty are from 8.00 to 11.45 a. m. and from 1.00 to 4.30 p. m. Certain officers are assigned night and week end duty. The physicians of this department have a meeting every Monday evening at 7.00 p.m., where papers on genitourinary subjects are read and discussed by the various members.

The list below gives the total number of soldiers examined and the number under active treatment in this department from June 24, 1918, until February 1, 1919; also the number of acute and chronic cases:

(*a*) Number of soldiers under active treatment	6,934
(*b*) Number of soldiers examined	12,024
(*c*) Number of cases infected after entering the army	119
(*d*) Number of cases that were chronic before entering the army	6,815

The following is a report compiled from a series of 2,907 cases; 1,391 of these cases were white, and 1,516 colored:

(*a*) Complications, epididymis (left side, 31; right side 15), 46 cases or (per cent)	1.8
(*b*) Prostatic involvement, total (white, 1,263 cases; colored, 1,485 cases), by palpation and smear or (per cent)	98

(*e*) Strictures of the urethra (white 120 cases; colored, 176 cases), total 296 cases or (per cent)	10.1
(*d*) Average time of urethral discharge in the acute cases (white, 28 days; colored, 29 days), average (days)	28½
(*e*) Average time of urethral discharge in the chronic cases (white, 18⅔ days; colored, 14½ days), average (days)	16⅓
(*f*) Average length of time to cure acute exacerbation of chronic gonorrhea (white, 65 days; colored, 64 days), average (days)	64½
(*g*) Average length of time to cure chronic gonorrhea (white, 66 days; colored 53.02 days), average (days)	69.06
(*h*) Chronic cases showed gonococci intracellular in the following number of cases (white, 37.1%; colored, 26.8%, average per cent)	31.7
(*i*) Numbber of recurrences (white, 6; colored, 0), total cases	6

Our records on vesicular involvement are not given here, due to the fact that some of the officers were inexpeieced and the observations made on these cases were not always correct. But we can safely state that the most common parts of the genitourinary tract to harbor the gonococci is, first, the prostate gland, next in importance are the vesicles, then come the urethral glands.

After the signing of the armistice a large number of soldiers suffering from venereal disease were transferred to their home camps, where the treatments were completed. This cut down to a large extent the number of cases we would have eventually discharged. However, the Camp Urological Department was able in seven months' time to discharge as cured 4,264 soldiers. Only thirty cases were discharged where recommendations were made for domestic service.

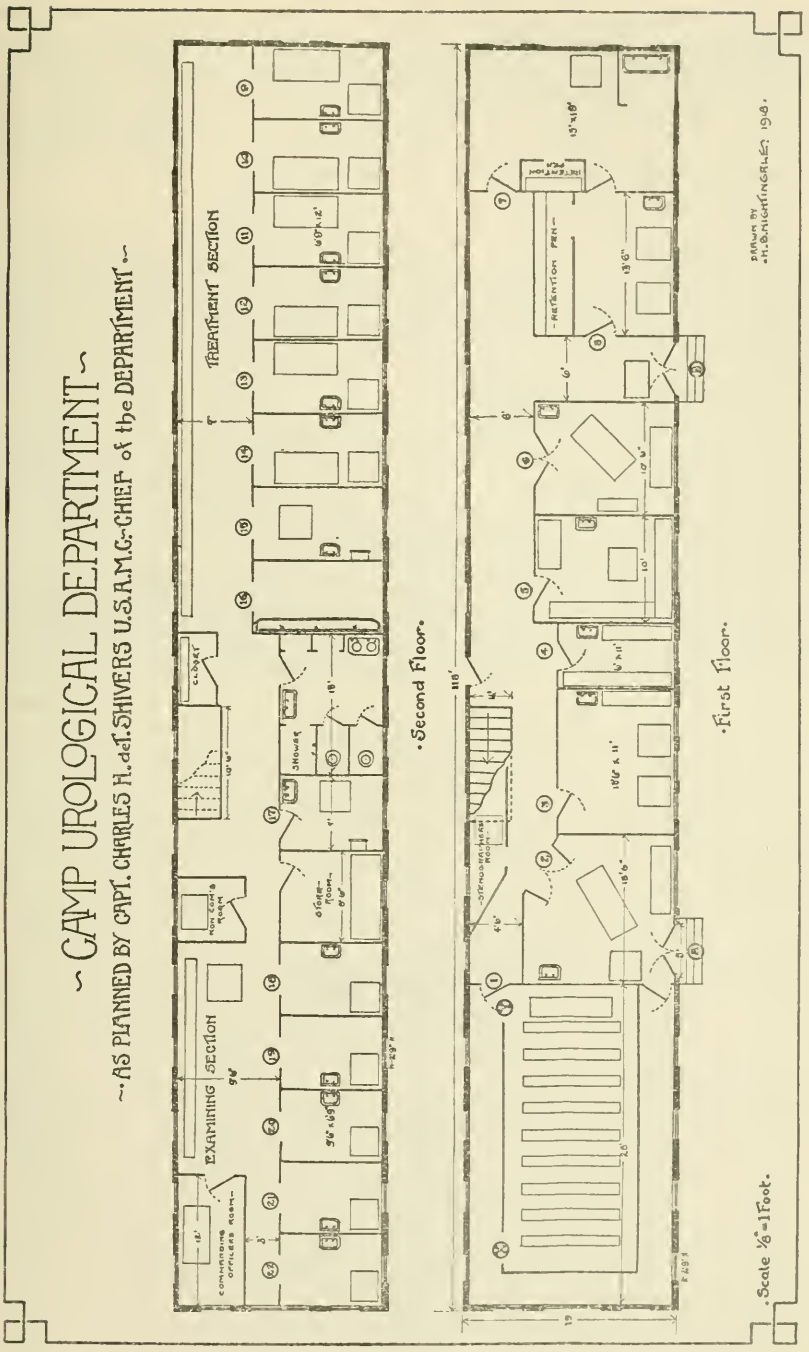
It is interesting to note that at the present time we have so few cases of venereal disease in Camp Dix. As you have seen by the foregoing figures, most of the cases that have been examined and treated in the Camp Urological Department were contracted prior to enlistment. The main reason for the enormous cut in the venereal rate of the Army has been largely due to the proper use of the prophylaxis. Taken in time and efficiently used we can truthfully say it is almost a positive preventive. This same prophylaxis should be applied in civil life, for it is much easier and safer to prevent the development of an infection than to cure one after it has once developed. The best results are obtained one hour after exposure and the percentage increases as the time goes one; but we have found that the results have been very good if the treatment is taken within eight to twelve hours after exposure.

We were so busy with our gonorrhea cases during the late summer and early fall that it was the latter part of October, 1918, before we were able to take over for treatment the ambulatory cases of syphilis. On

and after October 30, 1918, all cases of syphilis were ordered to report at the Camp Urological Department, Building No. 3, for diagnosis, disposition and treatment. All cases with open lesions are sent to the base hospital until their condition is cleared up, when they return to the camp department to have their treatment continued. Cases of syphilis are not retained in venereal battalions, and are on full duty except those cases following the administration of salvarsan, which is given in the afternoon when they receive quarters until the following morning at reveille. These cases are eligible for discharge from the Army within four weeks after their lesions have completely healed. Before the armistice was signed cases of syphilis that had not had open lesions for a period of two months would be sent across with their regiments, although treatment for the disease would be continued throughout their stay in the Army.

Syphilitic cases reporting for examination come between the hours of 8 and 11.45 a. m., and those for treatment between the hours of 1 and 4.30 p.m. The paper work, with the exception of the standard syphilitic register, is not different from that used on the gonorrhea service. A complete history is taken of all cases uuder treatment, careful examination is made of all viscera, and a urine analysis precedes each injection of salvarsan.

Those cases of recent open lesions returning to this department from the base hospital receive six injections of salvarsan one week apart, giving one decigram to 30 pounds of body weight, and the first dose given is one-half of the normal dose; 25 c.c. of water being added to the decigram, and after the sixth injection a thirty-day mercury rub is given, examining the urine twice each week. At the end of the month the patient receives one week's rest, then a course of thirty more mercury inunctions. We then wait four weeks and have a Wassermann taken, and if the Wassermann is positive the salvarsan and mercury are repeated, but if negative we simply repeat the mercury. It is very seldom that cases are held after this time elapses on account of transfer to other camps and discharges from the Army. If a patient remains with us at the end of the second course of treatment we give a rest of two months, and then the third course of treatment in accordance with the Wassermann. During the second year if the Wassermann remains positive we repeat the complete course of treatment with intervals of two months rest. If the Wassermann is negative during the second year we give two courses of mercury treatments with four months intervals. The Wassermann should be taken at six months intervals during the third year. If one cares to give a soluble preparation of mercury hypodermatically, one-fourth of a grain of bichloride of mer-


~CAMP UROLOGICAL DEPARTMENT~
~~AS PLANNED BY CAPT. CHARLES H. def. SHIVERS U.S.A.M.C.~CHIEF of the DEPARTMENT~~
EXAMINING SECTION
TREATMENT SECTION
RETENTION PEN
•Second Floor.
•First Floor.
•Scale 1/8"=1 Foot.
DRAWN BY H.B. KNIGHTINGALE 1918.

cury can be given in sodium chloride solution every second day for twenty-four or thirty injections. If an insoluble preparation is used, salicylate of mercury can be given in the buttocks once a week for nine or ten injections. The insoluble preparation of mercury is the most dangerous on account of its cumulative action. In tertiary syphilis potassium iodide should be given with the mercury, five to ten grains three times a day.

For men reporting here for their first examination with open lesions, dark field examinations are made on every cases. If we are able to secure the patient just as the sore is breaking down, the spirochaeta-pallida can be demonstrated in most of the cases. All cases of primary syphilis and those with suspicious lesions are sent to the base hospital for further study and treatment.

We have been very well pleased with the arsenobenzol manufactured by the Polyclinic Hospital Laboratories, Philadelphia, and with all the thousands of treatments that have been given in this camp we have not seen one serious result from its use, and its effect upon the progress of the disease has been most gratifying.

In closing this article I wish to express my deep appreciation for the valuable assistance given me by Captains R. A. Sempill, Samuel A. Buchenholz and E. H. Harsh, also Lieutenants R. E. Weaver and James C. Staats.

REPORT OF A CASE OF CEREBELLAR ABSCESS FOLLOWING SHELL WOUND OF SKULL AND SHOWING NO SYMPTOMS FOR PERIOD OF FIVE MONTHS

By Lieutenant FREDERICK THAYER HILL
Medical Corps, United States Army

THE diagnosis of cerebellar abscess generally presents difficulties under the best conditions. With the classical signs and symptoms present in sufficient number to confirm the diagnosis there is usually a great element of doubt which is only dispelled by the revelations of the operating or post-mortem rooms. Then indeed does the old axiom, "Hindsight is better than foresight," come to be truly appreciated. With all the evidence before us the formerly obscure and puzzling case seems indeed plain enough.

This case, resulting from a shell fragment penetrating the skull, presented some unusual features obscuring the diagnosis. Of special interest was the long period of latency, without signs or symptoms, as well as the absence of any pathology in the fundi. It was complicated by having had a trephine performed some months previously at the time of his injury and this, undoubtedly, had considerable to do with the lack of signs later.

In the classical case of cerebellar abscess we look for headache, especially occipital, apathy, slow pulse, tenderness and stiffness of the neck, ataxia, vertigo and disturbances of equilibrium, emesis, nystagmus to the diseased side and fundus changes. This case exhibited apathy, headache, both frontal and occipital, nystagmus to both sides and varying at times, and very little vertigo and emesis. Attention was distracted from the cerebellum and directed to the mid-brain by the fact that the course of the shell fragment had been traced through the tempero-sphenoidal lobe to where it was removed just above the occipital protuberance. Apparently there had been no invasion below the tentorium. At the time it seemed from both the history and the clinical picture that the mid-brain area was the more logical site of the trouble than the cerebellum. Without doubt we were unduly impressed with this picture as it appeared to us and did not lay sufficient stress upon what at the time seemed insignificant and otherwise easily explained symptoms.

The patient was a young white man, aged 23, and by former occupation a farmer. He was admitted to U. S. General Hospital No. 14, January 16, 1919, as an ambulatory case. The family history was negative. Past history: mumps, whooping-cough and diphtheria in childhood, malaria six years ago. No history of tuberculosis or venereal

disease. General physical examination showed a well-developed and well-nourished young man weighing about 150 pounds. He seemed in perfect physical condition except for a discharging left ear, with accompanying deafness. He was feeling perfectly well, complained of no headache or other untoward symptoms, and his gait was normal.

The history of his present trouble was as follows: October 2, 1918, in battle on the Champaigne front he received a penetrating wound of the skull from a high explosive shell. Patient was rendered unconscious and remained so for about six weeks, during which time he was operated upon in a base hospital. When he regained consciousness the wounds in the head and face had healed and the left ear was discharging. The notes of the operation at the base read as follows: "Removal of foreign body (shell fragment) a little above and to the left of occipital protuberance, three quarters of an inch in brain substance. One-half ounce of pus liberated. Necrotic brain tissue, drain, etc. Wound of entrance—large destruction of petrous portion of temporal. Drained through external auditory meatus. Great destruction of bone and brain substance." The foreign body had previously been localized by X-ray examination. Report of spinal fluid examination at this time was as follows: "Slight pressure straw-colored but not turbid. Cell count 49 per cm. No organisms." The white blood count was 29,160, and the differential showed 80 polymorphonuclear leucocytes.

Examination of his skull showed the following: A small wound penetrating the soft parts only, one inch to the outside of the outer canthus of left eye. A small shell fragment could be felt underneath the skin. The main wound of entrance was just above and anterior to the helix of the left auricle. Three inches posterior and parallel with the pinna was scar of the operation. A trephine opening about the size of a quarter of a dollar could be felt just above and to the left of the occipital protuberance.

The left ear had been constantly discharging since he regained consciousness. There was no pain, but he seemed slightly tender on deep pressure over the mastoid antrum. There was an atresia of the external auditory meatus about two-thirds of the way in, the canal being closed by granulation tissue which bled very easily. The discharge was of a thick purulent character. By means of a probe a sinus was demonstrated in the upper canal wall with bare bone at the bottom, apparently in the region of the attic. Hearing test was as follows: Conversation, one foot; Galton whistle, 0.3; low limit, 512 tuning fork; Rinné (512 fork), 8/10, Weber lateralized to the left. The right ear was normal. There was no spontaneous nystagmus or any signs of labyrinthine trouble.

The X-ray examination showed some blurring of the mastoid cells but no bony occlusion of the external auditory meatus.

Because of the discharging ear and the occlusion of the canal, operation was advised and performed on January 24 by Lieut. Col. T. J. Harris under nitrous oxide and oxygen anesthesia. The operative notes are as follows: "Usual mastoid incision-cortex opened. Sinus found very far forward in relation to the bony canal wall. Dura low. Bone bleeding and necrotic. Because of bleeding and position of sinus it was impossible to make certain that all the cells were cleaned out. Portion of bony canal wall removed. Körner flap cut and wound partially closed with silk-worm gut. Iodoform gauze to cavity."

The wound was allowed to drain for a time and then to close. It healed in about four weeks, but the discharge from the canal persisted as before. Granulations were seen at the bottom of the canal. He was put upon middle-ear treatment consisting of alcohol and boric acid instillations. Patient was up and about and feeling perfectly well. He was out on pass on several occasions. During this time the small shell fragment just below the outer canthus of the left eye was removed under novocaine.

March 7, five months after his injury, the patient complained of a severe headache and was put to bed. He had been out automobile riding the evening before. There was some nausea accompanying this, but, as he said that he had overeaten, this was considered gastric in origin. Headache was continuous in varying degree from this time on. At first it was confined to the frontal region, but later it became occipital as well. The temperature was normal and remained so throughout the course of the disease. The pulse rate was 84.

March 9, headache persisted localized in frontal region. Reflexes all negative. Examination of eyes by Captain Hubbard: "Pupils equal and react to light and distance. Muscles O. K. No nystagmus. Fundi negative."

March 10, he felt somewhat better but still had headache. There was noted for the first time a slight first-degree horizontal nystagmus to both sides. Cochlea was functioning, conversation being heard at distance of 6 inches, using the Bárány apparatus in the right ear. There was no vertigo. Neck was not stiff or retracted. He seemed rather hyperesthetic over the whole head. Neurological examination by Captain Caldwell and Lieutenant Miller: "Neurologically shows no definite findings other than the equally hyperactive tendon and abdominal reflexes. Mental findings subjective. Distinct hysterical reaction. Advise further observation. "Medical consultation showed "no primary gastrointestinal condition."

March 11, headache was occipital as well as frontal. He also complained of some pain in neck but this was not retracted or stiff. Patient seemed to prefer reclining on right side in a rather curled-up position. The examination of the reflexes was, as before, normal, except for some exaggeration of the tendons and abdominals. There was no change in the condition of his hearing. The discharge from the canal was rather profuse. Fundi were negative. The nystagmus continued as before, first degree horizontal to both sides. Pointing tests were all negative. There was no adiadokokinesis, dysmetria or asynergia. Seen in consultation by Major Raney, Chief of Surgical Service: "No evidence of intracranial involvement. No direct or localizing signs of pathology within head. Advise observation."

March 13, patient said he felt better. The headache was less severe. There was no vertigo, but he complained of "feeling weak." The nystagmus remained as before. The fundi were negative, the pulse rate 80. As his bowels were sluggish he was given magnesium sulphate, following which he was nauseated and vomited, the first appearance of emesis. Later in the day it was noted that he seemed drowsy and slept a good deal.

March 14, he felt better in the morning and ate a good breakfast. There was no nausea or vertigo. His hearing remained as before. A slight rotatory component was noted in his nystagmus for the first time. It was for the most part horizontal to both sides and only first degree, but there was added this slight rotatory movement to the left—the diseased side. We were unable to exclude a serous circumscribed labyrinthitis and deemed it advisable to keep the patient as quiet as possible to allow any acute signs to subside. It was considered best not to perform the fistula test, the result of which would have been doubtful in any case because of the condition of his middle ear. Following testing for nystagmus he complained of some nausea.

The next day there was no change. March 16, the rotatory component of the nystagmus had disappeared and was not seen again. He had some headache but not very severe.

March 17, his headache became very severe, requiring the use of opiates to give relief. He said that he was not dizzy, but was not disturbed to test for ataxia. The reflexes were all negative and the hearing, fundi and nystagmus showed no change. Some bulging was noted at the trephine opening and distinct pulsations felt. The pulse was 80. Testing for past-pointing without stimuli, he past-pointed to the left with the left arm but to the center with the right. Despite the pulse rate and the normal fundi we were undoubtedly dealing with a case of brain abscess, the location of which was a matter of grave conjecture.

March 18, he was distinctly worse, being irritable and stuporous. The trephine area was bulging more markedly but distinctly pulsating. Temperature normal; pulse 84. White blood count, 8,500. Differential polymorphonuclear leucocytes, 81; small mononuclears, 13; large mononuclears, 6. Fundi negative. The discharge from the ear was very foul and profuse. After consultation with the neurological and general surgical services it was felt that operation was advisable and that a radical mastoid with exploration in the region of the tempero-sphenoidal lobe offered the best hope.

Operation performed by myself assisted by Lieutenant Miller. Nitrous oxide and oxygen anesthesia. Incision through the old scar. It was necessary to dissect away a great deal of scar tissue, especially where the Körner flap had been thrown back at previous operation. The antrum was opened and granulation tissue removed from the cavity. The sinus was found forward against the canal wall. The plate covering the sinus was soft and was removed over a wide extent. The sinus appeared normal. Dura was exposed over a wide area, and anteriorly and above the external auditory meatus was found an area of firm, apparently organized granulation tissue about the size of a dime, evidently the site of entrance of the shell fragment. The bone in the angle between the sinus and the floor of the middle fossa was very soft and necrotic and this was cleaned out. The tegmen antri, as well as the internal plater just inside the sinus and forming the posterior surface of the petrous, was found apparently somewhat shattered or factured by the shell fragment. However, the dura seemed all healthy everywhere. It was carefully examined and no leads were found at any point. The bridge between the antrum and the middle ear was quickly taken down and granulations removed from the latter. The patient's condition at this time made it advisable to halt the operation at this point. While we of course, strongly suspected an intracranial abscess we did not feel justified in further exploration at this time, but thought it advisable to wait for more localizing signs later. The cavity was packed with iodiform gauze and one silk-worm gut suture taken.

He reacted well from his operation and the following day seemed somewhat brighter. The headache was less severe. The wound was clean.

March 20, headache was still present, but not to a severe degree. He seemed considerably better. The nystagmus was less noticeable, still horizontal to both sides but easily exhaustible. The packing was removed from the operative cavity, which was clean. The dural surface was carefully examined for any lead of pus, but none was seen, and the cavity was lightly repacked with iodiform gauze. The bulging at the

trephine opening remained as before. As this was always pulsating it was felt that there was no abscess at this point.

March 21, there was more bulging at the trephine area, but pulsations were still felt. Reflexes and fundi negative. The wound was clean, there being no pus from the ear. In the afternoon the headache became very severe, and after a consultation a lumbar puncture was performed, about 10 c.c. being withdrawn. The fluid was clear and only under the slightest pressure. Examination of this showed a positive globulin test and a cell count of 60. Following the lumbar puncture the pain became very intense, so that morphine had little effect in relieving it. In the evening the patient became delirious, and about five hours after the lumbar puncture he suddenly died.

Postmortem examination: Examination of the skull showed an irregular opening about 1 cm. in diameter through the squamous portion of the left temporal bone, the wound of entrance. About 1 cm. above the occipital protuberance to the left there was a trephine opening about the size of a quarter-dollar. The result of a recent radical mastoid operation was seen on the left temporal bone with the plate covering the lateral sinus removed over considerable area. Between this and the subarcuate fossa on the posterior surface of the petrous portion there was an irregular shaped opening about 1 cm. in diameter, either the result of a fracture or the pathway of a shell fragment. On its inner border there was evidence of callous formation, the internal margin being pushed backward some little distance, leaving a jagged angle protruding into the posterior fossa. This was thoroughly united. The tegmen of the antrum and posterior portion of the middle ear was missing, but the dura everywhere appeared healthy. The meninges were firmly adherent to the bone at the trephined area, and the brain substance at this point was slightly herniated. In the region of the longitudinal fissure the pia was adherent, and the cortex of the brain had a corroded appearance. Microscopic examination of the tissue in this area revealed the results of an old hemorrhagic process beneath the pia.

A fistulous tract, finger-size, extended from the wound of entrance through the left tempero-sphenoidal lobe to the trephine opening at the occiput, the main tract of the shell fragment. This was just lateral to the posterior horn of the lateral ventricle. Another very small fistulous tract was found extending from the first, backward to the left lobe of the cerebellum, where it opened into a large abscess cavity the size of a walnut. This cavity was firmly encapsulated and walled off, and filled with semi-solid white pus. The left hemisphere of the cerebellum was almost obliterated and what remained was very boggy, with all the natural markings lost. The cerebrospinal fluid obtained at this time was

cloudy and increased in amount and was found to contain many pneumococci, type No. 2, atypical. The pus from the abscess contained staphylococcus albus. Autopsy performed by Lieutenants Smith and Heise.

Without doubt this abscess was of long duration. It was very firmly encapsulated and had practically obliterated the whole left hemisphere of the cerebellum. For the first six weeks following his injury the patient was unconscious, but from that time until thirteen days before his death, a period of about five months, he had no symptoms of cerebellar involvement, or, in fact, of any trouble other than the otorrhea. Whether the abscess developed insidiously, or was of rapid growth during the period of his unconsciousness, and compensation developed through the other half of the cerebellum taking on the functions of the destroyed half, it is impossible to say. It certainly would seem that such adjustment did take place. The remarkable feature of the case was the fact of this man going about for five months feeling perfectly well with this large destruction of his cerebellum. Some jarring incident to his automobile ride must have stirred up the latent process. His discharging ear, upon which our attention was so largely focussed, was simply coincident and had nothing in itself to do with his death.

The pulse rate was at no time slow, averaging 84. His temperature was always normal. There was no vertigo until the last few days, and then it was very slight. He showed no ataxia or disturbances of equilibrium, although in the last few days he was not disturbed to test for the same. Headache was the one ever-present sign, at first frontal in location and later during the last ten days occipital as well, but varying in intensity. The occasional nausea and emesis, occurring in slight degree at the onset and again on the seventh and eighth days, was of greater significance than we gave credit for. His slight first-degree horizontal nystagmus to both sides, especially with its shifting and inconstancy, according to Ruttin was suspicious of cerebellar trouble. The appearance of the rotatory component on the eighth and ninth days is difficult to account for and was instrumental in leading us to think of a labyrinthitis. Of course this element may have been present at other times than when under observation, simply a part of the shifting and inconstant nystagmus. Four days before his death he past-pointed to the left with the left arm, a direct sign of cerebellar involvement, but, as it seemed to us at that time, too indefinite to warrant exploration without more localizing features. His apathy and headache could have gone with a temporo-sphenoidal abscess and this, coupled with the known tract of the shell fragment through this area, made us feel inclined to so regard the case. If his condition had been such that it would have been

a good surgical risk at his last operation, we would have explored the tempero-sphenoidal area and, failing there, would have turned our attention to the cerebellum and have undoubtedly discovered the abscess. It is almost certain, however, as subsequent events showed, that this would have been of no avail. His death sentence had already been signed, and it was too late for operation to have saved him. This was an example of hyper-conservatism. We waited too long, demanding too much in the way of localizing signs.

The time when operation offered the real hope of success was before the onset of these last more or less vague symptoms. The opportunity to have saved him was during the period when he was apparently all right or at the start of his manifested trouble, but the necessary indications were lacking. The wonderful compensation established by the other half of the cerebellum was a factor which served against him. The bulging at the trephined area, evident on the eleventh day, together with the headache and apathy, and the history of the case made it obviously a brain abscess, despite the atypical pulse and the normal fundi. The existence of the trephine without doubt was a factor in the maintainance of the normal appearance of the fundi. The inconstant nystagmus and slight vertigo, together with the ill-defined past-pointing phenomena, suggested the cerebellum as the site of the trouble, but at the time these were overshadowed by more evident signs. In the effort to be conservative exploration was deferred too long, until more localizing signs should be seen. The seemingly charitable thought not to disturb the patient in order to test for ataxia in the last few days, was probably a mistake, though there is still much doubt as to how much benefit it would have been to him. Of interest are the shifting and inconstant nystagmus and the past-pointing and the significance they have in a case of this kind.

ONE PHASE OF THE MOSQUITO WORK CONNECTED WITH ARMY CAMPS IN 1918[1]

By C. S. LUDLOW

Army Medical Museum, Washington, D. C.

AMONG the various activities which developed during the war, none are perhaps more marked than those connected with the health of our soldiers.

Supported by an authority never before at its command, the Medical Corps of the Army has been able to control the subordinate branches and details in regard to sanitation and hygiene, with the result that the health of the Army has been of a quality not possible of attainment at any previous time.

It is not the province of this paper to enter into a discussion of these various branches, for even to mention them and designate their activities would take considerable time.

Probably most important is the subject of preventive medicine, the value of which, with its many subdivisions, it is almost impossible to exaggerate. Under this subject, as one of the small subdivisions, comes medical entomology and its closely related branch, insect control, which covers control of breeding places and adults, and protection of the men from insect attacks by various mechanical and chemical means.

The work of medical entomology, as connected with our Army, in respect to the study of mosquitoes, was being carried on, under the auspices of the Surgeon General of the Army, as far back as 1901, in the Philippines, and collections were taken at many of the posts and subposts in these islands, the work being vigorously pushed for some years, and in a less extensive way it is still in progress. Later, about 1905, one summer's work was done in the continental United States, and collections from various points have been received occasionally ever since. This research was done from the entomological standpoint, did not include any experiments in transmission, and was intended to show what mosquitoes were present at a given station and what diseases were coincidentally present, in this way serving as a suggestion where transmission experiments might be undertaken.

In the Philippine Islands this research was, of course, pioneer work, while that done in the United States, Hawaii, Porto Rico, etc., has merely given added information to that already obtained from other sources. The epochal work in Cuba had already been done, and the

[1] All the data given in this article, including the distribution of certain Anophelines, are taken from the records of army camps for 1918, and do not in any instance include any other records made by various authorities.—C. S. L.

wonderful work in Panama, covering so many sides of the subject and done by a separate body of men, is of course unique in many ways and complete in itself.

Before going into any details of this study in medical entomology it is perhaps well to state what is believed to be its relation to the coördinate branch, insect control, which with the work in insect transmission seems to form the completed triad.

As any control work necessarily means a knowledge of the conditions to be controlled, so, in regard to mosquitoes, the identification of the forms present at a given station (post or sub-post) should be a preliminary and concomitant study, preceding and accompanying the control work throughout its whole course, otherwise much unnecessary labor and expense are likely to be entailed.

First of all it must be known whether the aim is merely a question of added comfort, or lessened discomfort, to the inhabitants of the locality, or whether increased health and efficiency are the definite results desired; and this, because the different groups of these insects vary considerably in breeding places, life habits, etc., and these are not the same even in different species of the same group, so that some initiative knowledge as to the mosquitoes present is desirable before control work is begun, and a contemporary study, running hand in hand with the control, should act as a sort of compass, indicating possible changes in methods and directions of attack, as shown by the species found to be present.

For this reason, and that the results might be recorded and correlated and so made available for future use by the Medical Corps, this research was instituted.

The work for the camps, cantonments and fields in 1918 was initiated by Col. D. C. Howard, Medical Corps, U. S. Army, in charge Division of Sanitation, Surgeon General's office, when he issued (March 21), "By Direction of the Surgeon General," a letter to the division surgeons stating, "It is desired that collections of mosquitoes be made in your camp and immediate vicinity" and directing that these collections be sent to "the Army Medical Museum for classification." Of course the "desire" of the Surgeon General, like a "request" from the President, is equivalent to a command and carries the same weight.

The necessary instructions for taking and mailing the insects, the boxes for collections, and wooden mailing boxes followed immediately, and these, with Colonel Howard's letter, were sent to fifty-eight stations by March 25, and the newer camps, cantonments and fields, as they were created, were supplied as promptly as possible, the total amounting to seventy-eight posts.

These instructions were quite complete and gave the period which a

given collection was expected to cover and the hours of collection. The killer of preference was indicated, and how it should be made, and suggestions as to other killers and traps given. The places from which collections might advantageously be made were stated, and specific directions as to the care necessary in taking and mailing the specimens and for the marking of the collecting (pill) and mailing boxes were also given.

These methods had been tried out for several years in the Philippine Islands and the United States and proven successful. The choice of places where collections might wisely be taken was guided by the fact that disease-bearing mosquitoes are usually found in close connection with the living conditions of man, and sylvan mosquitoes are rarely connected with the transmission of disease. This may be illustrated by three significant collections from the Philippine Islands.

1. The best and most valuable collections of Anophelines ever received in this work, and which extended over a period of some months, were taken by Col. W. P. Chamberlain, M. C., at Camp Gregg, who tells me that he put the ward collections, mostly daytime, in the hands of reliable Hospital Corps men, but that by far the greater number of mosquitoes were taken at night, after the lamps were lit, when he personally collected from the outside of the screens of the porch of his quarters, and that he was able to take these insects in large numbers because the sound of the mosquitoes buzzing on the screens was "like the rushing sound of distant waves."

2. The most interesting collections of sylvan mosquitoes, which included many new forms, were taken by Col. E. R. Whitmore, M. C., at Camp Stotsenberg. Colonel Whitmore took collecting tubes, killer, and vials, and went about 2 p.m. into the jungle near the camp, staying for two or three hours and sitting so quietly that "the wild hens paid no attention" to him, allowed the mosquitoes to settle and bite, and so secured rare specimens, some of which have never been duplicated. And this was in 1904! The very few disease bearers among them were marked "Caught in the woods, hospital and quarters," and it is to be remembered that Colonel Whitmore's collecting stations were not far from the camp.

3. I myself have in the Philippines often taken many Anophelines about 5 a.m., when the early morning sun was sending level rays into the houses, and these mosquitoes were eagerly seeking the way out. In fact no collections I ever made compared with these for the number of Anophelines. This does not, however, mean that this is the only part of the daylight in which Anophelines may be taken. There have been too many excellent collections taken during midday to allow of such a

statement, and the experience in some parts of Panama, where control of adults can only be effected by "hand catching," would entirely disprove it.

I also found daylight collections, taken during the hours of the "siesta" in the partly darkened rooms, gave excellent results in securing *Stegomyia fasciata* and other house-infesting culicines.

The first response to Colonel Howard's letter was quite general. During the summer collections have been received from fifty-seven stations, but while the records from some stations show the collections to have been regular and without intermission, unfortunately they are much in the minority. From one-third of the posts only one collection was received, and that in spite of various reminders, while from three no collections at all have come, and in one instance came the naive excuse that *after August* 20 efforts had been made to secure specimens but none had been obtained, and this in response to directions issued in March! At any one of these three stations, the chances of there being no Anophelines during the season, still less of there being no mosquitoes during that time, are extremely small.

Part of the failure to send continuous collections was due to the fact that when the divisions were ordered to new stations the papers and records were taken with them, and the officers who succeeded in command of the posts were often entirely uninformed in the matter. This condition was not at once recognized at the Surgeon General's office, and there was some delay in sending duplicate instructions.

Only a general idea of the results can be given, but the records from the collections are interesting and may prove instructive.

From Camp Lewis, American Lake, Washington, were sent very brilliantly marked *Anopheles punctipennis*, and from Camp Custer, Battle Creek, Mich., came *Anopheles quadrimaculatus, Anopheles punctipennis* and *Anopheles walkeri*, but neither of these posts has record of any but "recurrent" cases of malaria. Further south some of the stations showed as many as four species of Anophelines, and three of them malaria carriers! It is needless to say malaria was present.

The distribution of the Anophelines is also of some interest. Of these *Anopheles punctipennis* is, so far as these collections go, much the most widespread of all, being taken in Washington, Michigan, the western, the southwestern, the southern-border, the Gulf, the middle-western and the Atlantic states so far north as collections have been made in connection with this work. It occurs in connection with each of the other Anophelines as well as alone.

Anopheles quadrimaculatus, A. barberi, and A. atropos are all taken in the Atlantic coast states, the first spreading over into other sections

rather generally, but apparently not so widespread as *punctipennis*, and, either because it is present in less numbers or because it is more shy and less easily taken, is not sent in so frequently or in such large numbers as *punctipennis*. The other two species have definitely restricted localities, but *atropos* has been taken in Louisiana and is not well known.

Anopheles pseudopunctipennis is confined to a comparatively small region in the southwest, apparently not east of Texas nor north of San Francisco, but extends southward and is taken in large numbers in Panama.

Anopheles crucians shows a rather definite choice of localities, extending from the general vicinity of Washington and a little further north in the late summer, down the Atlantic coast states (on the general coastal plain), in the Gulf states as far as Louisiana, and probably eastern Texas, and up the Mississippi River as far, at least, as Little Rock, Ark. The localities suggest some peculiar choice of breeding places, not yet sufficiently worked out to admit of definite statement, though Dr. Metz's[2] article "*Anopheles crucians*, Habits of Larvae and Adults," gives very interesting points which apparently lead along this line.

The highest record of Anophelines at any one post in any one collection was eighty-four *Anopheles punctipennis* and sixteen *A. quadrimaculatus;* here, also, malaria was present. The next highest records are of thirty-four *Anopheles* in one collection, both of these being in camps in the United States. These records are, however, not to be considered as in any way reflecting on the sanitary officers at these places, because it is not always possible, even with the most careful and intelligent work, to control the breeding places in the camps, and our present knowledge precludes, as unwise, the assumption of a definite limit of flight from the extra-cantonment areas, which cannot perhaps be controlled.

The first specimen of *Stegomyia fasciata* from these camps was from Chattanooga, and it was rather quickly followed by specimens from Austin, San Antonio, Montgomery, Carlstrom Field, Florida, and Camp J. E. Johnston, Florida, the largest number coming from Camp Travis, San Antonio.

The routine methods at the Army Medical Museum have been, and are, the examination and determination of specimens and the recording of each lot under its proper post. The records cover all points available: date and hour of collection, name and number of each species, the report as to insect-borne diseases present, and the average strength

[2] Metz, C. W., Ph.D., Special Investigator, P. H. Report, Vol. 33, No. 49, December 6, 1918. Read at the annual meeting of the American Society of Tropical Medicine, June 16-17, 1919, Atlantic City, N. J. Published by permission of the Surgeon General, U. S. Army.

of the command, each being entered in successive columns on the same page, so that the whole story may be read at a glance and be quickly available for reference. A report of the findings of the collection is then sent to the camp surgeon and a memorandum sent to Colonel Howard showing the posts, dates, and in what numbers disease-bearing mosquitoes were taken. This method keeps the camp surgeons informed as to the kind of collections sent in and the Division of Sanitation of the whereabouts of the disease-bearing forms.

The lack of uniformity in the collecting has, of course, affected seriously the records, but, while not so complete as had been hoped for, it is believed they will prove of some value not merely for the Medical Corps of the Army, but, in connection with the work by the Public Health Service, will serve in that general survey of our country when, for the health of the whole people, the extermination of malaria is taken up as thoroughly as the hook-worm has been, and, while the work was done by and specifically for the Army, this thought has been always in mind.

DETECTION OF CARRIERS AND MISSED CASES OF DIPHTHERIA IN EMBARKATION AND DEBARKATION OF TROOPS

By Major EDWIN HENRY SCHORER, M. C., *Director of the Laboratory Division,* and AGNES SCHOLL RUDDOCK, *Contract Surgeon, Director Technical Work, U. S. A. Laboratory, Port of Embarkation, Hoboken, N. J.*

THE diphtheria bacillus is one of the most definitely recognized micrō-organisms; man can be tested to determine whether he is susceptible to its action sufficiently to develop the clinical disease known as diphtheria, and a specific antitoxin has been produced for the successful treatment of the disease. For these reasons the world at large and the medical profession especially are little inclined to pardon the spread of diphtheria bacillus infections, the occurrence of clinical diphtheria, and deaths due to this disease. Diphtheria has been so prevalent in this war that it must definitely be considered an army disease.

Unfortunately the diphtheria bacillus began to play an important part soon after the mobilization of the Army in 1917, and clinical cases of diphtheria and deaths due to the disease have occurred from time to time. Many times the disease was not recognized until at the autopsy table; this occurred not only in our cantonments in the United States but also among the fighting troops and troops in the reserve in Europe. Information is at hand that, not infrequently, gas poisoning was diagnosed when diphtheria actually existed. It was generally relatively easy to eliminate the disease from the organizations in the cantonments by taking nose and throat cultures of contacts and whole companies, so that while, not infrequently, diphtheria patients were received from these organizations and carriers were detected and held in quarantine or the hospital until free from diphtheria bacilli, the problem in the organizations in the field was not a serious one. In our hospitals, likewise, the spread of the disease was easily controlled by detecting and taking out the cases and carriers.

It was when soldiers were put under conditions where the space was limited or the field of their daily activities was restricted, even though not to the extent generally known as overcrowding, that infection with the diphtheria bacillus became an important factor. Trains and ships for the transportation of troops and hospitals for the care of the sick were the centers of the disease and needed to be most closely watched. The problem, therefore, was of utmost importance in this port of embarkation, through which alone 1,833,000 troops were sent overseas.

It is not proposed to enter into the clinical diagnosis or treatment of this disease, nor do we want to theorize on the manner of spreading the infection or overcrowding of space, nor do we feel certain as to the problem of contagion in general. We want, however, to emphasize that in the twenty-four hours to five days that were needed to bring troops to the port of embarkation, the clinical disease diphtheria not infrequently appeared apparently from a clear sky, that sick and wounded returning from overseas frequently had the disease or were carriers, and that the diphtheria bacillus really constantly presented a problem in embarkation and debarkation of troops. It cannot be assumed that infection with the bacillus and the development of the clinical condition all occurred while en route to this port of embarkation. The infection must have existed before the start was made, and while on the journey the host must have become sufficiently susceptible to make the development of the clinical condition possible. It has been observed that, not infrequently, apparently well carriers get the clinical condition when confined within doors, even if there is no overcrowding. Within one month after the base hospital at Camp Merritt was opened—that is, early in February, 1918—diphtheria bacilli, both in clinical cases and carriers, were found in practically every ward. The infection was so widespread that all of the patients in the hospital and enlisted men nurses and officers on duty in the hospital were cultured and the carriers isolated. After this all patients admitted to this hospital had throat cultures taken in the receiving office, and all patients remained in observation isolation wards until the cultures could be examined and reported on. From that time diphtheria has never been a general hospital menace at the base hospital, Camp Merritt.

With the opening of the base hospital at Camp Mills the same routine was established; later it was discontinued but resumed very soon, for the disease became a hospital menace when the precaution was not taken. When sick and wounded were brought back from overseas and our hospitals began to function for debarkation, the importance of diphtheria became at once evident, and on December 7, 1918, the following letter was sent by the surgeon:

OFFICE OF THE SURGEON, PORT OF EMBARKATION
HOBOKEN, N. J.

December 7, 1918.

From: The Surgeon.
To: All Commanding Officers of Hospitals.
Subject: Diphtheria in hospital patients returning from overseas.

In the patients returning from overseas there have been a number of cases of diphtheria and in one debarkation hospital there now are some fifty cases of diphtheria and diphtheria carriers.

Since March all patients admitted to the base hospital at Camp Merritt and

for some months all patients admitted to the base hospital at Camp Mills have had throat cultures taken by the receiving surgeon at the time of admission to the hospitals. At both of these hospitals patients have been held in receiving or observation wards until the laboratory reports on the throat cultures are made. This holds patients in the observation wards from twelve to twenty-four hours at the most. Patients having diphtheria bacilli in the throat and nose are put in special wards, those having clinical diphtheria are treated accordingly, while those who are merely carriers are Shick tested, sprays or instillations of 4 per cent argyrol or 1 per cent silver nitrate made in the nose several times a day, a gargle is provided, and at two-day intervals throat cultures are taken until three consecutive negative cultures obtained.

It has been found that most of the carriers quickly clear up when removed from the actual clinical cases, and that the chronic carriers are chronic carriers because of tonsil or adenoid abnormalities which can be operated on and corrected.

It has been found that culturing on admission and taking out the carriers helps markedly in the movement of patients through the hospital.

It is proposed that the Director of the Laboratory Division of this office notify the chief of the Laboratory Service of your hospital when patients from overseas are expected, that the chief of your Laboratory Service will supply the personnel to take cultures from the throat and furnish you a report as soon as possible. It is realized that this will give the laboratory a considerable amount of work at one time but, generally, will not give more than two heavy days in each week. The Laboratory of the Port of Embarkation will help supply such materials and examine such number of cultures as cannot be taken care of in your laboratory. The treatment and care of carriers as is outlined earlier in the letter is suggested.

By direction of the Surgeon:

Edwin Henry Schorer,
Major, M. C., U. S. Army.

Since December 10, 1918, no patient has been admitted to our hospitals or transferred from hospital to hospital in these headquarters but what a throat culture has been taken for the presence of diphtheria bacilli. We have used the following classification:

1. Clinical cases.

2. Carriers. The carriers may have become such because of infection from (*a*) clinical cases, or (*b*) carriers.

The carriers may be casual or chronic. We have generally listed as a casual carrier a soldier whose throat became diphtheria-bacillus-free within ten days after isolation, three negative cultures on alternate days being necessary to release the carrier.

The plan for taking and examining cultures generally used at the United States Army Laboratory, Port of Embarkation, is as follows:

The laboratory was informed of the number of patients to be expected on each ship and materials were prepared in readiness for the notification from the receiving office of the arrival of the patients. After medical examination, delousing and bathing, all patients passed through a small door near the elevators which were to take the soldiers to their assigned wards. At this door was placed a table of supplies,

with a team of three laboratory workers, one to take the throat cultures, one to record the names and wards, and one to number each tube after inoculation with the same number which appeared before the soldier's name on the written sheet. The record of the names was kept on ruled sheets as follows:

U. S. S. *Agamemnon*, Feb. 3, 1919

No.	Name	Ward	Floor
1	Barefield, Willie	2	5
2	Gordon, Herbert	3	3
3	Carrigaro, Daniel	3	3
4	Hall, Frank	2	5
5	Hurd, Percy	2	5
6	Senis, Robert	9	3

The culture of Willie Barefield was numbered No. 1 with a red wax pencil; that of Herbert Gordon was numbered No. 2, etc.

After each man was cultured he proceeded to his ward. If there were any litter cases arriving at the same time as the ambulatory patients, another group was stationed at the elevator which took the litter patients upstairs. Sometimes, if there were a thousand or more new admissions, two tables and two sets of workers were placed at the door to facilitate the clearing of patients from the receiving room. In that case the group at Table I kept the names in books (previously numbered 1–100, 300–400, 500–600), while Table II used the alternate sets of numbers and marked their tubes accordingly. With such an absolute system the men could be cultured quite rapidly; the work on an average day was timed, and we found that 1,206 patients were cultured by two groups at the approximate rate of 200 per hour. This, of course, depended upon the speed with which the men entered and passed through the receiving rooms.

The cultures were placed in the incubator and left there from eight to twelve hours. Upon removal from the incubator the tubes (which could not have been kept in exact order) were renumbered with a blue pencil beside the red number starting at 1 and set apart in consecutive groups of ten. With each group was a glass slide marked off into 10 squares:

The number at the left of the slide was the index number; slide No. 0 having consecutive smears of tubes 1–10 (blue pencil), slide No. 1

tubes 11–20, slide No. 20 tubes 201–210, etc. On a ruled sheet was recorded the old (red) number of each tube as well as the new number: when the fifth smear on slide No. 0 was found to be positive, No. 5 on this list showed that the tube was No. 610, which number and the corresponding name were easily located on the original list. After smears were made on the ruled slides, the tubes were discarded and the numbered lists were relied upon for the location of carriers. A great deal of bookkeeping and labor was saved by recording and reporting the positive cultures only; if no report was received in a ward at the end of 24 hours the surgeon knew that there were no carriers among the new patients.

New No.	Old No.	New No.	Old No.	New No.	Old No.	New No.	Old No.
1	603	9	273	51	547	59	52
2	12	10	815	52	416	60	68
3	57	11	360	53	62		
4	906	12	289	54	78		
5	610	13	74	55	110		
6	48	14	32	56	36		
7	3	15	97	57	427		
8	94			58	319		

The diagnosis of the diphtheria bacillus has been entirely based on the morphology of stained specimens under the microscope. The routine stain was Neisser's methylene blue (30 sec.) and counterstain of 0.5 per cent aqueous saffranin (15 sec.). This gave a distinct marking of bright blue granules in a pink bacillus. Positive diagnosis was made only when the bacilli showed polar granules, or distinctly barred and uneven staining. It is interesting to note that Captain Blanton in his "Report of Diphtheria at Camp Custer, Michigan,[1] found that 90 per cent of organisms isolated from *clinical* cases showed di-polar granules. The virulence of the organisms was not tested in this laboratory, nor was it deemed necessary to do so. The cultures were obtained from soldiers whose companions had true clinical symptoms and who themselves developed the clinical symptoms. We did test a considerable number of isolations on the various sugars, and none gave the characteristic reaction of the pseudo-diphtheria bacilli.

The efficiency of our methods, that large numbers of cultures can be well taken and examined, and that the movement of patients through the hospitals need not be interfered with, was easily proven. A few instances only need be given. On January 12, 1919, two soldiers, whose cultures had been found to contain diphtheria bacilli, were absent without leave, and on March 20, when the same organization was again cultured, these same two soldiers were again found to be carriers. On March 12, two men in an organization were found to be carriers, but by error were not removed from the organization by the 23d of March when, on culturing the organization, the same two soldiers were again picked up. Two clinical cases were released on recovery after three negative cultures. One week later all the patients in the ward to which they had been transferred were cultured and no carriers were detected.

[1] Blanton, W. B.: Report of Diphtheria at Camp Custer, Michigan. Torr, A. M. A., May 10, 1919, p. 1355.

In not all of the hospitals was it possible to distinguish between soldiers just off the transports and patients already in our hospitals. However, at the large hospitals used for debarkation, Debarkation Hospitals Nos. 2, 3 and 5, and Embarkation Hospital No. 4, we have data on 50,456 admissions of patients directly from overseas.

The results of examinations are shown in Table I.

TABLE I.—*Showing Cultures for Diphtheria Bacilli in Soldiers Arriving on Transports.*

Month	Debarkation No. 3			Debarkation No. 5			Debarkation No. 2			Embarkation No. 4		
	Patients	Pos.	Per cent	Patients	Pos.	Per cent	Patients	Pos.	Per cent	Patients	Pos.	Per cent
Dec.....	4,482	34	0.7	810	14	1.73	2,261	60	2.65	384	2	0.5
Jan.....	2,958	37	1.18	1,442	19	1.32	2,033	59	2.41	278	2	0.71
Feb.....	3,198	51	1.62	2,958	45	1.52	1,128	17	1.51	425	1	0.21
March...	5,651	70	1.23	5,473	61	1.11	1,108	5	0.45	294	1	0.34
April....	8,520	81	0.99	4,047	32	0.79	.....	.....	.....	438	1	0.23
May.....	2,378	19	0.79	.....	.....	.....	.....	.....	.....	229	1	0.4
Total..	27,187	292	1.07	14,730	171	1.15	6,530	149	2.13	2,012	8	0.39

Grand total: Patients 50,456; Positive, 640; per cent, 1.26.

From the table it will be seen that at the different hospitals the percentage of positive cultures varied from 0.39 to 2.13. It is, however, to be noted that Debarkation Hospital No. 2 served largely for contagious debarkation patients, Embarkation No. 4 for officer and nurse debarkation patients, while Debarkation Hospitals Nos. 3 and 5 were used for general enlisted men's debarkation hospitals. In December, 1918, and January, February and March, 1919, the percentage was higher than in April and May.

While 1.26 per cent of positive cultures in debarkation patients is not high, still the actual number, 640, is large when the short period of time and the actual number of exposures are considered and well justifies the labor expended.

Table II shows the relation between carriers and clinical cases at Debarkation Hospital No. 3. The clinical cases were practically always detected on admission cultures.

TABLE II.—*Showing Carriers and Clinical Cases Admitted to Debarkation Hospital No. 3.*

Month	Patients admitted	Carriers	Clinical cases
December, 1918.....	4,482	34	2
January, 1919.....	3,958	37	13
February, 1919.....	3,198	51	20
March, 1919.....	5,651	70	30
April, 1919.....	8,520	81	17
May 1–15.....	2,378	19	15

From March to September 1, 1918, 10,079 embarkation patients were admitted to the base hospital at Camp Merritt. The findings are shown in Table III.

TABLE III.—*Showing Results of Cultures on Admission of Embarkation Patients to the Hospital*

Month	*Total number*	*Total positives*	*Per cent*
March	1,534	54	3.52
April	1,694	68	4.01
May	1,815	47	2.59
June	1,764	43	2.44
July	1,632	14	0.85
August	1,640	22	1.34
	10,079	248	2.36

It will be observed that the percentage of positive diphtheria cultures was larger for embarkation than debarkation patients.

It is evident that isolating, from the general patients, those harboring diphtheria bacilli, is feasible and indicated. The organisms in the throats of carriers and patients were readily transmitted to others and it was necessary to take cultures on our hospital personnel almost every month because cases occurred in the doctors, nurses and hospital corps men. In the hospital personnel the rate was very high. The rate is shown in Table IV.

TABLE IV.—*Showing Results of Cultures on Hospital Personnel*

Month	*Total*	*Positive*	*Per cent*
December, 1918	57	3	5.26
January, 1919	2,335	49	2.09
February	52	3	5.76
March	2,566	109	4.25
April	2,717	42	1.55
May	1,991	39	1.96
Total	10,118	245	3.38

From the table it is seen that the hospital personnel on duty at debarkation hospitals was very frequently infected, the rate being double that of debarkation patients. Probably the high rate in February and March was due to coexisting respiratory trouble in patients. During this same time ambulance drivers, crews on our receiving ships, hospital trains, guards and so on, who did not take care of patients, only had a carrier rate of 1.03 per cent in nearly 4,000 cultures taken.

The detection and taking out of carriers, in hospitals which must be quickly evacuated, might at first be regarded as a drawback so far as evacuation is concerned. Some believed it unnecessary, but this we believe we have already disproven; others doubted the virulence of the organisms, but this, too, we believe has been disproven by our data. Most of the carriers are not sick and clear up rapidly when properly treated.

While carriers were usually treated at the hospital in which they were detected as carriers, an effort was made to collect them at certain hospitals as often as was possible. Usually argyrol or silver nitrate swabs and sprays were used once or twice a day, gargles of Dobell's solution were used three times a day, chronic carriers were taken care of by the nose and throat specialists, and not infrequently the tonsils were removed. While the treatment was practically the same everywhere, the results differed markedly. This is shown in Table V.

TABLE V.—*Showing Length of Time Patients Had to Remain in Isolation as Diphtheria Carriers at Various Hospitals.*

	Casual carriers				Chronic carriers						Grand average in days
	No. of carriers	Less than 10 days			10 to 20 days			20 days or longer			
		No.	Per cent	Aver. No. days	No.	Per cent	Aver. No. days	No.	Per cent	Aver. No. days	
O'Reilly.....	65	30	46.1	7.8	24	36.9	12.9	11	18.3	22.7	12.2
Deb. No. 1.....	100	42	42.0	6.8	35	35.0	13.7	23	2.3	28.7	10.94
Deb. No. 3.....	276	178	64.2	5.1	74	26.7	12.7	15	5.4	24.4	8.0
Deb. No. 5.....	36	32	88.8	7.0	3	8.5	15.3	1	2.3	22.0	8.1
Emb. No. 4.....	66	59	39.4	8.4	7	10.5	11.8	0	000	0	8.8

Embarkation Hospital No. 4 (Polyclinic Hospital, 50th Street and 9th Avenue, New York City), for officers and nurses.

Debarkation Hospital No. 1 (Ellis Island). Contagious disease hospital data include convalescents from clinical diphtheria.

Debarkation Hospital No. 3, Greenhut Building, New York City, general debarkation hospital.

Debarkation Hospital No. 5 (Grand Central Palace), general debarkation hospital.

Hospital Ship *O'Reilly*, tied at Pier 45, North River, New York.

It will be observed that in all hospitals there were some chronic carriers but that officers and nurses quickly cleared up, and that in the large hospitals a large percenage were only casual carriers. On the hospital ship a large percentage remained carriers a long time, and apparently getting out in the air and sunshine makes a great difference. This is well brought out by the results on the hospital ship *O'Reilly*, where only 12 per cent cleared up in ten days or less compared to the results at Embarkation Hospital No. 2 in the country at Secaucus, N. J., where out of 270 carriers only 9, or 0.033 per cent, had to be held for more than ten days to get three negative cultures.

SUMMARY

1. Diphtheria is a disease of considerable importance in an army quickly mobilized.

2. Many soldiers in an organization develop clinical cases or become carriers in a short time.

3. Hospital attendants are easily and frequently infected in caring for the sick.

4. Taking throat cultures for detection of cases and carriers on admission to the hospitals is feasible, warranted and indicated.

5. Most of the carriers can be quickly cleared up when removed from the foci of infection.

NOTES ON HOSPITAL TRAIN SERVICE IN THE A. E. F.

By Lieutenant Colonel EDWARD M. COLIE, Jr.
Medical Corps, United States Army

PRIOR to the date when the United States became actively engaged in the late war, the question of equipment for wholesale evacuation by rail, under conditions of modern hospitalization, had been considered and so far worked out that the Pullman Company had constructed one specimen car of the sort. The Manual of the Medical Department touched generally upon the subject, and Field Service Regulations sketched the relation of the Hospital Train Service to the Military Railway Service. When hospital train personnel began training about January, 1918, the only source of information anent equipment was to be found in a reprint of a British account of a sixteen-car train, British built, and recently exhibited in London. As cited in this bulletin, the personnel was to consist of 3 medical officers, 3 nurses, and 31 enlisted men of the Medical Department. As organized in medical officers' training camps, train units were commanded by majors, M. C., assisted by two first lieutenants. Early in the year it was found necessary to divert the majors M. C., and the command and organization of hospital train units was committed to officers of the Reserve Corps. Under these officers hospital train units were equipped with equipment "C" as rapidly as the matériel was available, noncommissioned officers were instructed in their duties, and the enlisted men given the maximum daily amount of drill, hiking, and instruction in first aid, surgical nursing and sanitation that could be crowded into twenty-four hours and have the men thrive. The net result of this intensive training was that, at the date of embarkation, each commanding officer of a hospital train unit had under his command a small, compact unit of 31 men, well schooled in the manuals pertaining to their work, capable of executing commands with unquestioning intelligent precision, and requiring little disciplinary action upon the part of the commanding officer; a unit which was readily adaptable, because of the breadth of its fundamental training, to exercise the functions of sanitary organizations, and available for duty in the inspection and in the treatment of larger bodies of troops. Such hospital train units were frequently available and were used at ports of embarkation, on transports, at ports of debarkation and in rest camps in conducting the frequent physical examinations necessitated by the crowding of transports in the large troop movements of that period. On the transport they manned the sick bay and dispensary and throughout the voyage assisted at the frequent physical

examinations which were made to exclude communicable disease. If it so happened that the commanding officer of a hospital train unit was at the same time surgeon to troops or S. M. O., then the train crew became at once his efficient fingers for the execution of transport sanitation and for the care of the sick.

There were in the service of the A. E. F. several efficient trains of the French type with corridor cars and litters on standee frames, but as these were in no sense standard equipment they will not be dealt with at this time. Of the standard United States hospital train there were some twenty or thirty in commission, and there would have been more up to the number of fifty had the war lasted longer and the need for them become apparent. Of this type of hospital train, U. S. Hospital Train No. 58 is a typical example. It was composed of sixteen cars built of wood upon steel frames, with central corridor the length of the train, solid vestibule, and with doors in the middle of the sides of each car, built in the shops of the London and Northwestern Railway, ferried across the Channel and delivered to the shops of the 19th Engineers at Nevers, Nievre, where it was assembled as a train and the installations completed, including the coupling up of the generators with the axles of the trucks on each car and the setting up of the storage batteries through which the generators worked. These generators and batteries were the source of our light, and after the charge acquired on the initial run to Brion-Laizy we were never without ample light for all purposes. Car 5801 was the isolation ward car and was divided by transverse partitions with sliding doors into four compartments of six beds each, with a central section into which the side doors gave entry and in which were situated two latrines and a wash sink with running water. This mid-car space could comfortably accommodate sitting patients up to the number of 10, in addition to the 24 bed patients which the car normally accommodated. Car 5802 was equipped with three rooms for officers and three rooms for nurses, with separate dining compartments for each at the opposite extremities of the car as well as a wash-room for nurses in their quarters. A swinging door in the lateral corridor separated nurses' quarters from officers' quarters. This car was equipped with independent heating apparatus.

Car 5803 was the kitchen which served officers and nurses and, on the run, served the forward end of the train. In this car was also the officers' wash-room and latrine, as well as two compartments for the transportation of 16 sitting sick or wounded officers. At its rear end was a bath and shower for officers. For reasons of water economy this shower was sealed early in the career of the train. Cars 5804-5-6-7-8 were ward cars of the standard type, the same double doors in the

middle of each side of the car as was noted in the isolation ward car, which was a modification of the standard ward car, which had eighteen beds on each side of the car arranged in three tiers. These beds were made with iron frame and wire springs and a medium thickness fiber mattress, the whole easily demountable for cleaning and so arranged that the middle bed could be folded back against the side wall of the car, in this position forming the cushioned back of a bench of which the lower bed formed the seat. This arrangement of the beds made almost instantaneous the transformation from a ward designed to accommodate 36 lying patients to a ward which accommodated 12 lying upon the top tier of beds and seated 5 to the bench—60 sitting patients—thus doubling the capacity of the car without in any way encroaching upon the aisles or other free spaces. Each car had independent water tanks, with sink and running water, a cupboard with the ordinary ward utensils and a compartment in which was a bucket latrine as well as racks for bed pans and urinals.

Car 5809 combined office and pharmacy, having at one end a small ward of twelve beds, next a well-equipped pharmacy with water and instrument sterilizers operated by "primus stoves," next a comfortable office with small safe and ample accommodation for the keeping and storing of records and papers. Beyond this, in the same car, was a compartment designed for operating and dressing room, which was ample for an ordinary work of the sort. The operating table was formed by a medical department litter supported against the outer wall of the car by two swinging brackets. Immediately above the operating table was a second set of similar brackets, so that in emergency this compartment could be used with two litters as bunks, making a two-bunk compartment. Cars 5810-11-12-13 were of the standard ward type. Car 5814 was the kitchen serving the enlisted personnel and the rear half of the train and contained, as well as the personnel dining-room, a three-bed sleeping compartment for the noncommissioned officers. Car 5815 was a slight modification of the ward car and was fitted up with beds for the enlisted personnel, with a moderate space devoted to lockers and storage of personal effects. Car 5816 was the storage and equipment car and was supplied with ample and well-arranged cupboards, lockers, and shelves for the storage of supplies and spare parts for the train. There was in addition, at the rear end, a small office for the supply officer, in the rear of which was a meat safe cooled by the circulation of air. Ice was not available for issue, and therefore the storage of meat was a matter of some difficulty in warm weather. Meat supply was a very important consideration and called for much careful planning.

At the extremes of the train, and not communicating with the rest of the train, were compartments for the railway employes. In these compartments were hand-basins with running water, water closet, and a cushioned bench of sufficient length to permit of reclining at length.

Such was the train found waiting at Nevers upon arrival of the hospital train units from the base ports. Upon assignment to a train by the chief surgeon of that district, requisition was at once made for such articles of equipment as were needed, for rations for the personnel, as well as 2,000 reserve rations required to be at all times on hand. An additional enlisted man was received here in the person of a mechanic from the 19th Engineers, who was attached for duty with the train and was charged with the maintenance of the mechanical equipment of the train, brakes, running gear, electric lights, etc.

All train movements were made upon "*Ordres de Transport*," which are in effect and in form not unlike our "Transportation Requests." Orders directing train movements came through the "Regulating Station" or "*Gare Regulatrice.*" Such were located at Le Bourget, in the district of Paris, and at Is sur Tille and St. Dizier in the advanced sections of the S. O. S. Regulating stations were in possession of routing data and in constant touch with the French Railway Commission, and all matters concerning the railway service were arranged by them. The French system of railways, although well adapted to their needs, seems, to the mind habituated to our system, to be inelastic and hidebound by traditions which we have long since outgrown. However, their system enabled them to fight in the way that they did, and that in spite of the fact that they were very obviously crippled in the matter of man power as well as in the matter of equipment and trackage, which had suffered both because of the shortage of matériel and of labor The use of the air brake, while the rule, is by no means universal, and upon many occasions the commanding officer of a hospital train has spent uncomfortable hours while being hurried along by a small but powerful engine and without an air brake capable of functioning. Occasionally at such times a crew of two or three women would be put aboard to operate the hand brakes, but this was not invariably done. The sense of insecurity experienced was commensurate with the relief felt when we again secured an engine with air equipment.

During the months of June, July, August and September, Hospital Train 58 made the following evacuations:

26	June, from Coulommieres to Vichy	352
9	July, from Vaugirard, Paris, to Savenay	610
16	July, from Coulommieres to La Chapelle, Paris	542
18	July, from Ivry, Paris, to Vichy	583

20 July,	from Ivry to Chateauroux	302
	Limoges	268
23 July,	from Crepy én Valois to La Chapelle	341
25 July,	from Vaugirard to Bordeaux	578
29 July,	from Coulommieres to La Chapelle	562
2 August,	from Coulommieres to Chateauroux	428
7 August,	from Chateau Thierry to Chaumont	512
16 August,	from Vaugirard to Nantes	560
21 August,	from Ivry to Royat, Puy de Dome	381
27 August,	from Chateau Thierry to La Chapelle	429
29 August,	from Villers Cotterets to La Chapelle	221
31 August,	from Coincy to La Chapelle	452
2 September,	from Villers Cotterets to La Chapelle	348
3 September,	from Ivry to Nantes	340
6 September,	from Chateau Thierry to La Chapelle	330
7 September,	from Chateau Thierry to La Chapelle	406
9 September,	from Coincy to La Chapelle	423
16 September,	from Chaumont to Montpont, Dordogne	386
22 September,	from Langres to Tours	375
26 September,	from Souilly to Bazoilles, Haute Marne	408
Total patients to this date		10,137

At evacuation points loading was habitually effected by the combined efforts of the bearers from the hospital being evacuated and the enlisted personnel of the train. Speed in loading was rarely a desideratum, as under the usual conditions at the loading point no difficulty was experienced in loading as rapidly as the ambulances could bring up the patients. Frequently German prisoners were requisitioned for bearers, a function which they filled very efficiently. I shall never forget the uncanny impression made by a guard on duty with a couple of squads of prisoners who were assisting the loading at Chateau Thierry upon one occasion. Armed with a rifle and bayonet and with face smeared with mercurial ointment, he was a sight to strike terror to the most hardened. When fully loaded with all beds occupied, the capacity of the train was 360. When carrying both seated and lying patients, the load could be increased to 570 without making inroad upon the normally free spaces aboard the train. By placing lying patients in the personnel car and by placing extra seated patients upon benches in the middle part of each car opposite the side doors, the capacity of the train could be stretched to acommodate 610 without serious overcrowding. As a breakdown capacity, with 6 extra lying patients to the car upon litters in the aisles and all free spaces full, including the pharmacy floor and that of the operating room, the capacity could be stretched to the extreme limit, 740. In this instance the aisles were encumbered to a degree which made passing through the train slow,

and the service to patients was slowed down in consequence. It will be seen that this is a very wide range of adaptability, and when it is remembered that the figure 610 represents no overcrowding of a train built to convey 360 lying patients, it will be conceded that the designers of this type of hospital car have achieved more than a moderate degree of success. The figures for the evacuations above cited are very illustrative in this connection, for on the night of the second of September, while shifting position in the yards at Pantin, the train was rammed by a freight train and cars 5811 and 5812 wrecked. From that date through the period covered by these notes the train was composed of fourteen cars only, with a bed capacity of 288.

When the order for an evacuation was received at the train and while en route to the evacuating point, both kitchens were placed in full swing, so that upon arrival, or as soon thereafter as a car was loaded and the doors closed, the ward master and his assistant could begin to dispense, to those in condition to receive it, the soup prepared in the kitchens. This soup, made from a fresh beef stock, with such vegetables as the local markets afforded, was the staple article of diet en route. After much experimentation it was found that, for the type of patient chiefly carried, this was at one and the same time the most acceptable to the patients and the most easily prepared in the quantities required. When fed and other personal wants attended to, patients were so tagged as to indicate at a glance the nature of the treatment that was required en route, fracture cases were vised and adjusted to secure easy riding, Dakin-Carrel cases were conspicuously marked, and the treatment carried out by instillation every two hours. Data for the "Detraining State" was collected from the tags and sent to the office for consolidation. In the first instance, dressings which required attention were done by a medical officer. Subsequent dressings were done by a medical officer or by an enlisted man according to his directions. In the earlier evacuations all Dakin-Carrel cases were treated by a medical officer, but soon, under their instruction, the enlisted men became habituated to the proper manner of carrying out the treatment, and to appreciate the evidences of its proper and of its improper execution and they were charged, under direction, with its administration, thus liberating several hours daily on the run to other details of treatment. It is believed that the importance of the Dakin-Carrel treatment cannot well be overstated, at least as regards the adminisration of it to wounded men in process of transportation by rail under these conditions. With the continuous application of this treatment, badly infected patients can be transported for as long as thirty-six hours and arrive at the detraining point in better condition than that in which they were en-

trained. To those familiar with this neo-listerian antisepsis it need not be said that the continuance of the treatment en route hastens the date when secondary closure can be instituted, and thus saves, in the aggregate, hundreds of days of hospitalization. It was frequently remarked by visiting medical officers that, in spite of the large numbers of very gravely infected patients carried upon some of these evacuations, there was a complete absence of the "smell of pus" in and about the wards which had just been emptied. In this observation the officers of the train heartily concurred. In this connection it is to be remarked that the type of bed adopted for the hospital trains was one well designed for the handling of severe multiple fractures, for spinal cases, and for other severe mutilations, in that it was a very simple and easy matter to demount the bed, send it to the hospital and there have the patient transferred to the train bed and have bed with patient transferred to the train either by ambulance or, if the distance were not too great, by four bearers. When the bed with patient arrived at the train it was hooked into position in the most convenient location in the car, with reference to the probable need for access to the patient en route. At the detraining point, in like manner, the bed could be sent to the hospital, thereby minimizing the disturbance to the injured parts. This procedure was not infrequently resorted to.

For some time it was customary to operate the hospital trains with a male personnel only. This, in the writer's experience, was found to be entirely practicable from the standpoint of care and treatment of the patients, for the enlisted men were quick to learn and had a generally high appreciation of their responsibilities. They acquired great dexterity in the handling of patients, and, as they were under continuous bedside instruction, their possibilities were in no sense exhausted by the demands made upon them. Later the three nurses allowed by the Tables of Organization were supplied and, while they were in all instances very efficient as well as supplying interest to the sick and wounded in the presence of the feminine touch, yet probably in no material respect was the service rendered to the patients improved by their presence. Unavoidable inconveniences undoubtedly arose from the confinement of the two sexes in the contracted space.

Night evacuations from the advanced rail heads were often made under conditions of poor lighting and threatened bombing; aside from this they presented few features different from other evacuations, as the routine of loading at evacuation points was fairly well crystallized. When cars were loaded, the outer doors locked, and the word given to the *Chef du Train* that we were ready to leave, feeding, dressing and medication continued like clockwork throughout the run, one medical

officer being at all times on duty in the wards and another supervising the kitchens and diets. On the run no one removed clothing, and if an officer or a man were relieved for a few hours he slept in full clothing.

The progress of the train was furnished to the detraining point in two ways; one, by a telegram sent by the commanding officer of the train either from the point of departure or upon the first opportunity, stating in both French and English the number of the train, number of bed patients, number of sitting patients, gravely injured, gassed, medical, communicable disease, French or other allies, German prisoners, and probable hour of arrival. The other information went through the *Gare Regulatrice* and the French Railway Commission and was a railway communication pure and simple, giving merely the number of the train delays en route and the probable hour of arrival. Arrived at the detraining point, there were turned over to the evacuating officer, by the commanding officer of the train, the "Detraining State," a tabulated statement of the classes of patients in the convoy, the valuables of the patients, for which receipt was taken. The cars were emptied in accordance with the directions of the evacuating officer.

Three hours after arrival usually saw the train empty and the *Ordre de Transport* for the return to garage signed and in the hands of the *Chef de Gare*. On the return trip the men usually slept in the wards the first night so that they could keep their eyes upon the property in the car, for stops on return trips, *petite vitesse*, were long and there were many occasions when, lacking this precaution, blankets and such like might have been checked short. Reveille the next morning was late, 8 a. m., and after breakfast cars were cleaned, washed down, blankets were folded for the laundry, and by 11 a. m. the cleaning was completed. In the afternoon fresh blankets were drawn from the supply car and the cars made up for another evacuation. This matter of the regular washing of the soiled blankets after each evacuation was an important one and is probably responsible for the small amount of infestation among members of the train personnel. The blankets were usually found to be highly infested. By 4 p. m. the work was completed and the wards stood inspection. Supper was at 5 p. m., and shortly after that the men were in their bunks. Some time in the early morning of the following day the train arrived in garage, when the mess officer at once began to restock the supply car, while the crew replenished the water tanks throughout the train. Early bed was the rule on this night also.

Water supply was at all times a problem of importance. Each car had two 100-gallon tanks connected with the wash sinks, and the two kitchen cars had extra tank capacity, but potable water supplies were

not to be found in all parts, and the drain occasioned by a day's run with a full load of 500 or more was a matter which called for very careful water management. For this reason, when the train was switched into the "zone" at Pantin to charge the tanks from the hose connections there, as soon as the tanks were filled the G. I. cans, originally designed as receptacles for soiled dressings, but never used for that purpose, were filled with potable water and placed where they could be reached and yet be out of the way, and, as the kitchen tanks became low and before they were depleted to a point which would render it unsafe to use the kitchen ranges, these sources were drawn upon by the kitchen details. When in garage, out of the "zone" at Pantin the tanks were replenished every morning, but as the train was between one-half and three-quarters of a mile from the nearest hose connection, it was necessary for the water detail to fill G. I. cans, run them down to the train on a hand car, and fill the tanks with bucket and funnel. When garaged at Bourmont, Haute Marne, waiting for evacuations for the St. Mihiel Sector, the only source of water was a small spout distant from the train a third of a mile. This spout delivered the pitiful amount of half a gallon per minute, and in order to make good the daily consumption in the kitchen it was necessary to start the water detail early in the morning, continue all day and well into the night. In operating from this garage it was impossible to provide water necessary to cook for a loaded train and this, upon one occasion, led to a very considerable and uncomfortable delay in feeding a convoy evacuated from Langres, where the water was absolutely taboo, a fact unknown to the regulating station which directed us to charge tanks while loading with patients. The following incidents are worthy of recital as illustrating the ability and adaptability of the enlisted men of the Hospital Train Service. In the first case there were some 375 patients of all classes loaded in the early morning and, for the reason cited, the start from Langres was made with water sufficient only for a few hours' cooking. After a considerable controversy en route and a delay of five hours a water stop was arranged at Bar sur Aube, where there is excellent water in ample quantity distributed from some fifteen faucets beside the railway siding, but without hose connections. In the face of this mild emergency, with the customary bucket and funnel, the tanks were filled in forty minutes and the train proceeded to Tours, where it discharged its convoy at St. Pierre de Corps the following morning. The second incident occurred at the time of the collision at Pantin which wrecked two ward cars as we were preparing to make an evacuation from Coincy. Setting to work immediately after the accident the two wrecked cars were completely stripped of all movable property

and fixtures; these were stored away on the train and all was in readiness to proceed with the evacuation upon schedule time. The men were justly proud of both of these achievements.

In all work over French railway lines there are many places and occasions where a moderate speaking knowledge of the language is important and of great service, not only in minimizing the unavoidable friction incidental to doing important and urgent work in foreign surroundings but in securing positive and sympathetic assistance from railway people of all grades.

Taken all in all, the hospital train service was an exceedingly useful and busy service. It offered large opportunity from the human standpoint and from the standpoint of surgical treatment, as differentiated from operative surgery, and in quiet times and out of the way places offered a rare opportunity to minister to the medical needs of a large civil population deprived by the war of all assistance of this sort.

EDITORIAL

THE ANNUAL MEETING

Mention has been made in previous issues of the journal of the coming annual meeting. As has been stated, this will occur in St. Louis, Missouri, beginning Monday, October 13, with the last session on Wednesday, October 15.

As this meeting, the first since the close of the great war, will largely determine the future of our Association for better or worse, and as it will surely not be better unless we all get together at this meeting and do the things that should be done, it should be not only a pleasure but a patriotic duty for every member who possibly can to not only come himself, but to try and bring a prospective fellow. We should all help to make this meeting a post-bellum medico-military jubilee which will have as an end result the bringing together, as a unified body, all the medical patriots who heeded the call to the colors, to the preservation of the state, the perpetuation of our institutions, and the glory of American medicine.

The Headquarters of the Association in St. Louis will be at the Hotel Statler, corner of Washington, St. Charles and Ninth Streets. The assembly room of the meetings will be the Ball Room on the top floor of this hotel so that those who secure accommodations at the Statler will be in most convenient touch with the various sessions of the Association.

As a matter of interest to the members of the Association, we quote below the room rate schedule as given in the booklet of the Hotel Statler:

Room with shower bath only for one person, $2.00 per day; for two persons, $3.00.

Room with tub and shower for one person, $3.00 to $5.00; for two persons, $4.50 to $7.00.

Two connecting rooms for two persons, $6.00 to $9.00; for four persons, $9.00 to $13.00.

Suites of parlor, bedroom and bath (tub and shower), $6.00, $9.00 and $13.00.

Private dining room and additional bedrooms (connecting) may be secured if desired.

We also quote below the following paragraph from a letter of the Management to Col. F. A. Winter, chairman of the Committee on Arrangements:

We are just as glad to care for fifty persons as we are for five hundred, and our rooms at $2.00 per day are as cheerfully at your disposal as those of a higher rate.

We have expressed the hope in previous issues that this would be a

well-attended meeting and, with the wealth of experience due to the war service of the members, there is every reason to hope that the program will be unusually interesting and instructive. It is the endeavor to have addresses and papers from the more prominent members of our Association and from those who are particularly qualified to speak on the subjects they have chosen. In order to give a working idea of the character of the meeting and the sequence of the various sessions, we publish herewith a tentative program covering the time from the opening meeting on Monday, the 13th, up to the final session. It must not be understood that this is final or authoritative in all minor details, as it is given mainly as a guide and indication of what the general purpose and scope of the meeting is to be:

ANNUAL MEETING, ST. LOUIS, MO.

MONDAY, OCTOBER 13

Opening meeting at 9.30 a. m.

1. Address of the President, Reports of Executive Council, Secretary-Editor, Treasurer, Committee on Arrangements, Literary Committee, Committee on Legislation, Boards of Award, Necrology Committee, Appointment of Nominating Committee and Committee on Resolutions, Consideration of Amendments to Constitution and By-laws, Miscellaneous Business.
2. Reading of two papers and discussion.

Second Session, 2.00 *p. m.*

1. Reading of two papers and discussion.

Third Session, 8.30 *p. m.*

1. Motion Pictures showing activities of the Medical Department in France, or topics of kindred interest.
2. Address or reading of one paper.

TUESDAY, OCTOBER 14

Fourth Session, 9.30 *a. m.*

1. Report of Nominating Committee.
2. Election of Officers.
3. Reading of two papers and discussion.

Fifth Session, 2.00 *p. m.*

1. Reading of two papers and discussion.

Sixth Session, 8.30 *p. m.*

1. Reading of two papers and discussion.

WEDNESDAY, OCTOBER 15

Seventh Session, 9.30 *a. m.*

1. Installation of Officers.
2. Report of Auditing Committee, Committee on Resolutions, etc.
3. Unfinished business.

It is earnestly desired that all those who can possibly do so will attend the meeting and lend their assistance in making it of unusual interest and value to the Association. J. R. C.

WHAT WE HAVE BROUGHT HOME

The rapid change in events, the upsetting of our orderly and settled routine and regime which has come about since, on the 6th April, 1917, we declared that we were in a state of war with Germany, has of very necessity shaken about our ears much of the structure which before that time was all that we knew of existence. Now that we can see the promise on the other side of the clouds of war, I suppose that, individually and collectively, we are asking ourselves, "What did I get out of it?" Not in the sense of material gain, for, after all, comfortable as are physical blessings, we sought in our crisis other ends and made for a very different goal. Reflection must sweep a wide field to answer even in a general way, this question. When the Powers which direct our destinies at the Peace Conference have correlated each piece of the puzzle and shaped the whole into a harmonious entity, we shall be able to see what it means for us as a nation, as a people.

We are not political economists, we of the profession of medicine, and therefore our place in the part of our country's councils is at best limited to an intelligent effort to understand the logic which frames the terms, and to agree or disagree with the findings in the spirit of moderation which is becoming in those who must perforce judge largely in ignorance.

From that angle, then, we must have no active concern as to what our efforts have enabled us to bring home. It is to be settled for us by heads wiser than ours.

If we leave the questions of international politics as too broad a matter for our speculation, we still find ample opportunity for analysis of matters which affect us as a profession and as individuals. It is not probable that we shall now find for ourselves, either as medical officers, or doctors, or as the ultimate *ego* of the individual, altogether satisfactory responses to all the things we ask. This is not unnatural.

In the first place, the events of which we have been a part were of such magnitude that the grasping of them and the orderly classification of them are something which cannot be done by "snap judgment." Then, again, we believe very firmly in the French dictum, "*le nuit porte conseil.*" Time does modify views which at first seemed beyond dispute. Logic loses its verity when it has stood over night and has had a chance to cool. "Colors seen by candle-light do not look the same by day." And so, we believe, the convictions which many of us hold at present may undergo modification as we view them from the perspective of "tomorrow," where often the light is better than in the haze of "today." This is, in our opinion, true of some things; not so of others. When it is a question which depends for its answer on the

personal equation of the individual, it must be granted that reflection, possibly a loss of a certain amount of prejudice, will turn the ashes of utter disapproval to a somewhat brighter tint and that we may see that the thing was not, after all, utterly bad. But, on the other hand, there are questions of fact. Modes of procedure which universal trial has proved at fault. New processes which have stood the acid test of actual use, which do not depend on the workings of our minds for their evident and manifest usefulness.

We suppose that the things in this category are those which are often referred to as "the lessons of the war."

Those, tried and found good, are surely some of the things which we have brought home. And we are sure that none of us will fail to admit that they are worth keeping and worth using again in the life to which we revert, whether it be in prevision against future conflict or in the accustomed routine which we knew before the Four Horsemen of the Apocalypse swept over our land.

It seems to us—has always seemed—that the lessons of this sort have a very general application—are not to be confined to any one particular class. Surely the advances made in the many steps of the technique of our chosen profession must be a matter of common interest to each of us, whether we remain with the profession in arms or go back to the ways of peace.

We do not intend to categorically list here the things which we have brought home. Our object in the title of this editorial is to suggest to other individuals the same thing which has been running throug hour mind. Did you profit by the opportunity which knocked at your door? If you did, in what way? If not—then whose was the fault?

It occurs to us that some of the things which we might have brought home were a keener knowledge of ourselves, our capabilities and our limitations. A better knowledge of our fellow-men. Admiration for those who held their heads up and played the game. Regret for those who failed in the hour of trial. Memories of cheerful courage, of patient resourcefulness, of fortitude, of skill and well-applied energy; of smiling, willing acceptance of the hard luck which held some while others went; of the spirit of sacrifice which animated us, the people of the Republic, to give of our best as long as we could, wherever the fortune of war set us. All this must have worked to broaden us and to broaden our views, and, in a profession which has such paramount need for qualities of this kind to live up to its traditions, we must have profited by what we saw and were a part of.

We viewed life from a large angle. We departed from the view of

the retailer to know how big things could be done in a big way, and that should help us too.

Better perhaps than all else, *we came to know each other.* To have done that, and to have found that, after all, there is so much more to praise than blame in the world is a lesson very worth while.

Suffering, pain, agony, privation—all that we saw too. Many times, for, alas, that is war. But, after all, it was not just the torn flesh, the racked nerves, the acute physical misery—it was the Spirit behind it. The fine soul which, unconquerable in its extremity, counted as little its own torment provided only that the Right should not perish.

F. R. C.

REDIVIVUS

Senate Bill No. 1258 proposes that it shall be a misdemeanor, punishable by fine or imprisonment, or both, to use any dog in the District of Columbia or any of the territories of the United States for experimental purposes. It is directed, of course, against experimental medicine and is a continuation of the fitfully flaring fight against "vivisection." The phrasing of the Act is mostly for the dog instead of against the vivisector. Save by the implication in the context, it is more of a plea for the dog than an arraignment of the practice of animal experimentation, or "vivisection" as popular terminology has it.

The postulate of the bill is that the dog is the friend of man; that he serves a useful purpose; that he has gone to war, served there, been wounded, decorated and of very material assistance during active operations. The first clause of the proposition we will admit, with reservations; the second with reservations, and as for the third, while some of it is incontestably so, it is not, in toto, in conformance with facts.

Some dogs are the friend of man: not all of them. We have distinct personal recollections of several who were far from friendly and it is probable that, if dog statistics were compiled, it would be demonstrated that the total of unoffending persons bitten by their supposed friends would run into very respectable figures. This, aside from the yearly treatment of rabies, a condition which, it is true, the dog is not responsible for, but which is of sufficient importance in pathology to have given a universal significance to the name of Pasteur.

Some dogs are useful; that is true beyond a doubt, but if they were classified by some cold blooded statistician in reference to the importance of the part they play in the economic scheme of things we have a grave suspicion that the unproductive dogs would far outnumber those who earn their living.

It is true that there were dogs employed in the late war. It is the fact, however, that an undue prominence was given to their importance.

The type universally conceded to be the best fitted for military use was the "Police dog." The serious disadvantage of this breed is that it is a "one man" dog. Trained by its master it will perform for no one else, the consequence being that if the man, the other side of the equation, is not in evidence the result is zero. Under his direction, this dog can and has carried messages, but never to the exclusion of the "runner service" or the employment of audible or visual signaling. It is a job which primarily belongs to man and the one advantage which the dog has is his "low visibility," to twist a technical term. He was, relatively, as efficient in performing this service, which belongs to his human associate, as man would be if educated up to the same standard in doing some task which is primarily the business of the canine race. He cannot add sensate intelligence to speed and the ability to traverse ground which would be more difficult for man, and to that extent is he inferior. He by no means replaced the faithful, unsung "brancardier," or stretcher-bearer, who was responsible for the first transport of his wounded brother of the line. If we grant that the dog could find a wounded man, we must also admit that it was only his master, man, who could retrieve him, or give him the aid and succor which he needed. We were informed by both the French and British, during our tour of duty in France, that the sphere of usefulness of the dog in war was a very limited one and not to be considered seriously, save as a means of traction for sledges in the snow-covered hills of the Vosges in winter.

We are aware that this is more or less beside the question, but it is in a measure an answer to the phraseology of the bill referred to. The crux of the situation is, of course, the still apparently unsettled question as to whether serious members of the medical profession are justified in the use of animals for experimental purposes with the object of affording increased protection from disease to human beings. To the medical profession in general it would seem that there is but one answer to the question. To those who are familiar with the results obtained from experimental medicine there can be little doubt that the advancement thus gained in both surgical and medical procedure altogether justifies the use of animals for this end. If it did not, would it continue. Is it at all probable that men who are intent on the demonstration of scientific truths would waste their time in hammering away at a method which brought them nowhere. If we admit, and we surely must, that the experimenters have a definite object in view, we should certainly also admit that any means which they consistently employ are those which will demonstrate the truths which they seek, and are not carried out as a means of personal gratification and at the expense of time which might be profitably given to more fruitful measures.

The very persistence of the method should be its best defense. Evil dynasties, bad laws, undesirable customs fail automatically through the test of time, and those methods which do not bring the results sought are quickly discarded, mainly because they are a waste of valuable time. It would be millennial, of course, if we could go through life without sacrificing anything in order that we might ourselves live, but so long as man is the dominant force, so long as this world is *his* world, it is inevitable that the lesser orders of creation pay tribute. We eat them, and we wear them, and we exterminate those which interfere too much with our convenience or the production of our staple crops.

All this is so much a matter of routine that it is not a matter for "any amazement" save for the occasional protest of the vegetarian. The question of vivisection is not in the established category occupied by our depredations on animal life for the purposes quoted, and for that very reason there will be objection to, and rebellion against it until the majority of mankind recognizes the fact that it is not aimless, wilful cruelty carried on for no good reason and with no tangible result. Vesalius faced the same opposition when he sought to teach anatomy by the dissection of the human body. Who, now gives the matter a second thought save as a rather gruesome means of acquiring accurate information.

The proper use of animals for the demonstration of laboratory truth has received the unqualified support of so many of the foremost minds of our profession that it would seem that some weight should be attached to the expressed opinions. Unfortunately, the majority of the uninformed public content themselves with denying categorically the statements made and the reasons adduced by those who ought to know whereof they speak. It is hardly probable that a man of such world-wide prominence as Dr. W. W. Keen of Philadelphia, or many more of equal eminence, would defend the practice if it were unjustifiable. They are men of too keen perception to be misled by specious reasoning, and it is unthinkable that they should advocate the taking of animal life unless they were very sure that the sacrifice were justified.

The introduction of the bill will undoubtedly call forth more or less comment in the press, and it is these articles, written often by those uninformed or entirely prejudiced, or both, which will specifically attack the profession. What effect these attacks will have is problematic, but they do not make pleasant reading for us of the profession who know, from the standpoint of both men and doctors, the incontestable necessity for the continuance of properly regulated experimentation as an adjunct to didactic methods.

James Robb Church.

ASSOCIATION NOTES

At a recent meeting of the Executive Council, the following amendments to the Constitution and By-Laws were approved by a majority of the council and are published below in accordance with Article XI of the By-Laws. Proposed additions in black face type; proposed eliminations in brackets:

CONSTITUTION AND BY-LAWS OF THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES[1]

PREAMBLE

The Medical Officers of the Army, of the Navy, of the Public Health Service of the United States, and of the Organized Militia of the Different States, under the provisions of an act of Congress approved January 30, 1903, *have associated themselves together under the name of "The Association of Military Surgeons of the United States." Now, therefore, pursuant to the laws of the United States, the members of said Association do hereby ordain and enact the following:*

CONSTITUTION

Article I

NAME

The Association shall be known as "The Association of Military Surgeons of the United States."

Article II

OBJECT

The object of the Association shall be to increase the efficiency of the medical service of the Army, the Navy, the Public Health Service, and of the Organized Militia of the different States by mutual association and the consideration of matters pertaining to the medico-military service of the United States both in peace and in war.

Article III

MEMBERS

Classification of Membership

Section 1. There shall be Active, Life, Associate, Ex-Officio, and Honorary Members.

Members Eligible to Office and Entitled to Vote

Sec. 2. Active and Life members only are eligible to office or entitled to vote.

[1]Adopted September 26, 1911.

Active Members

Sec. 3. Active membership is limited to commissioned medical officers of:

1. The United States Army;
2. The United States Navy;
3. The United States Public Health Service;
4. The Organized Militia of the several States;
5. The United States Volunteers.
6. **Ex-medical officers and**
7. **All Medical Members and Medical Examiners of Local Medical Advisory and District Boards, officially appointed by the President of the United States, the Provost Marshal General of the United States Army, and the Governors of the various states for the purposes of the Selective Draft Act.**
8. **Acting Assistant Surgeons (Contract Surgeons) of the U. S. Army, Navy and Public Health Service.**

Active members may retain their membership, should they be honorably discharged from the service in which they have been commissioned, and nothing in this Article shall affect the membership rights of Contract or Acting Assistant Surgeons of the United States Army, Navy, or Public Health Service who were duly elected prior to the adoption of this Constitution.

Life Members

Sec. 4. Life membership and exemption from payment of annual dues is conferred upon—

1. Members who obtain first honorable mention in the prize competitions of the Association.
2. Any active member upon the payment of fifty dollars at one time.
3. Ex-presidents of the Association.

Associate Members

Sec. 5. Associate membership is open to—

[1. Ex-Medical Officers and]

2. Other officers of the aforementioned services;
3. Ex-medical officers of the Confederate Army and Navy;
4. Medical officers of foreign service; and

[5. Acting Assistant Surgeons (Contract Surgeons) of the U. S. Army, Navy and Public Health Service.]

Ex-Officio Members

Sec. 6. The Secretary of the Treasury, the Secretary of War, the Secretary of the Navy, the Surgeon General of the Army, the Surgeon General of the Navy, the Surgeon General of the Public Health Service,

in conformity with the Act under which this Constitution is adopted, shall be ex-officio members of the Association.

Honorary Members

Sec. 7. The President of the United States, the senior general officer of the Army, and the senior flag officer of the Navy for the time being, shall be honorary members. Other persons who have rendered distinguished service to the Association, or who have otherwise attained distinction deserving of recognition by the Association, are eligible to honorary membership.

ARTICLE IV

GOVERNMENT OF THE ASSOCIATION

Advisory Board

SECTION 1. There shall be an Advisory Board consisting of the Secretary of the Treasury, the Secretary of War, the Secretary of the Navy, the Surgeon General of the Army, the Surgeon General of the Navy, the Surgeon General of the Public Health Service and the President of the Association.

Officers

Sec. 2. The officers shall be a President and three Vice-Presidents, [who shall be elected from and represent in regular rotation the Army, the Navy, the Public Health Service, and the Organized Militia;] a Secretary [and a] Treasurer; all of which officers shall hold their respective offices until their successors are elected and qualified.

Executive Council

Sec. 3. There shall be an Executive Council, to consist of the officers and six (6) members, who shall be appointed by the President each year.

Committees

Sec. 4. There shall be the following committes, to be appointed annually by the President, except as hereinafter specified.

A Literary Committee, to consist of seven (7) members.

A Publication Committee, to consist of four (4) members, one of whom shall be the Secretary as ex-officio chairman.

A Necrology Committee, to consist of four (4) members.

A Committee of Arrangements for the next ensuing meeting, to consist of one (1) member, who shall be the chairman, with power to associate with himself such other persons, members of the Association or not, as he may see fit.

A Nominating Committee, based upon a representative or one vote for each State, Territory, the Army, the Navy, and the Public

Health Service, and for every additional ten (10) members or major fraction thereof an extra representative or vote; said vote or votes to be cast by a member or members, present from each State, Territory, Army, Navy, and Public Health Service, to be designated by the members present from each State, Territory, Army, Navy and Public Health Service at the time of meeting.

A Committee on Legislation to consist of five members, one each from the Army, Navy and Public Health Service, and two members from the Organized Militia, to be nominated by the President and elected by the Association in annual meeting. (Adopted, Annual Meeting, Sept. 13-15, 1915.)

A Sinking Fund Committee to consist of the President, who shall be Chairman, the Secretary-Treasurer, who shall act as secretary and custodian of the fund, and three members to be elected from the former Presidents of the Association, the latter to hold office for three years. Those first elected shall select by lot who shall go out at the end of the first, second and third year respectively, and each year thereafter one member shall be elected to the Committee at the annual meeting of the Association. Vacancies occurring in the interval may be temporarily filled by the Committee.

Boards of Award

Sec. 5. Boards of Award shall be appointed by the President for the consideration of such prize competitions as may from time to time be instituted by the Association. Membership in the Association shall not be required of members of the Boards of Award, which shall be selected in each instance from men conspicuous for knowledge of the subject of the competition.

ARTICLE V

SEALS, INSIGNIA AND ARMS

Seal

SECTION 1. The seal of the Association shall consist of a circle, one and three-eighths (1⅜) inches in diameter, charged with the cross of the insignia with the words, "Organized 1891, Incorporated by Congress 1903," within a circumferential band bearing the words, "Association of Military Surgeons, United States."

Insignia

Sec. 2. The insignia of the Association shall comprise (1) a Cross; (2) a Ribbon.

(1) The Cross shall be of gold, the obverse enameled with red and bordered with gold, upon which shall be superimposed a white shield, inclosing a shield of the United States in its proper colors—red, white

and blue with stars of gold—surrounded by the motto, "Omnia pro Patriæ Caritate;" the reverse, plain gold and bearing its number. Upon the reverse may also be engraved the name and address of the owner. The cross, suspended by a ribbon, consisting of two bands of crimson inclosing a band of white, may be worn by any member of the Association on ceremonial occasions, and shall be carried on the left breast—or at the collar, if the wearer be an officer of the Association.

The Ribbon

(2) The ribbon to be worn with civilian dress shall consist of a piece of ribbon 3/16 of an inch wide of the official colors of the Association, to be tied in the upper left hand button hole of the civilian coat and around the lapel with the knot to the rear.

The Coat of Arms

Sec. 3. The Coat of Arms shall be as follows: Quarterly. First: Sanguine, a caduceus or; for Army. Second: Or, an oak leaf and acorn proper; for Navy. Third: Agent, a caduceus and an anchor in saltier azure; for Public Health Service. Fourth: Azure and argent, the Union as borne on the American Flag; for the Organized Militia.

Surcharge.—The Badge of the Association, proper.

Crest.—An Eagle displayed, proper, bearing on breast a Geneva Cross.

ARTICLE VI

QUORUM

Thirty-five (35) members shall constitute a quorum for the transaction of business, but a less number may adjourn.

ARTICLE VII

AMENDMENTS

All amendments to this Constitution shall be proposed in writing at one annual meeting and [voted on at the next]. A three-fourths vote of all the members present at the annual meeting shall be necessary for adoption.

ARTICLE VIII

SINKING FUND

Such funds belonging to the Association as are not needed in current requirements shall be placed in the hands of a Committee to be known as the Sinking Fund Committee. The Sinking Fund shall be invested in Government or other bonds approved by the Committee, or deposited in an approved Trust Company until so invested and no money shall be withdrawn from this fund except upon a majority vote of the Sinking Fund Committee and of the Executive Council voting

separately in session or by letter. When withdrawal is thus approved, it shall be made by an order on the **Secretary-**Treasurer signed by the President of the Association. The custodian (**Secretary-**Treasurer) of the fund shall be bonded in such sum as the Committee shall determine, and his accounts, and the securities and funds shall be audited annually and at such other times as the Committee requires.

BY-LAWS

Article I

ELECTION TO MEMBERSHIP

Active or Associate Membership

Section 1. Election to active or associate membership shall be by the Executive Council, to whom the Secretary-**Treasurer** shall refer all applications, together with such credentials as may be presented.

Honorary Membership

Sec. 2. Election to honorary membership shall be by a two-thirds vote of the Association, after the unanimous recommendation of the Executive Council.

Article II

Expulsion from Membership

Any member who may be dismissed from the service for conduct unbecoming an officer and a gentleman, or who may be guilty of such conduct though then not a member of the service, shall be expelled and debarred from any further rights or privileges when proper proof has been furnished.

Article III

Meetings

The Association shall meet annually, the time and place to be fixed at each meeting for the one ensuing. Special meetings may be called by the President at any time. At the annual meeting the President, **and** Vice-Presidents [and Treasurer] shall be elected for the term of one year, the Executive Council and standing committees appointed, and the annual reports received.

Article IV

DUES AND FEES

Admission Fee

Section 1. The admission fee to be paid by active and associate members shall be [five] **one** dollars [($5.00)], **$1.00**, which shall accompany the application for membership. [This shall include subscription to The Military Surgeon for one year.] **Should the ap-**

plicant desire to receive THE MILITARY SURGEON, **the official journal of the Association, for one year, the amount to be sent with the application for membership should be four dollars ($4.00).**

Annual Dues

Sec. 2. The annual dues shall be one dollar ($1.00), due on the first of January of each year. No annual dues shall be required of new members for the remaining portion of the calendar year in which their admission fees have been paid. Delinquency for two years shall terminate membership, after due notice by the Secretary-Treasurer. Provided that in the case of members who have resigned or have been dropped for non-payment of dues under Section 2 of this article, such members may be readmitted without payment of a second entrance fee and upon payment of delinquent dues.

Members Exempt from Dues

Sec. 3. Honorary, Ex-Officio, and Life Members shall be exempt from the payment of dues.

Official Journal

Sec. 4. The annual subscription to the official journal by members of the Association shall be three dollars ($3.00), payable in advance, and the journal shall be stopped on expiration of unrenewed subscription.

ARTICLE V

DUTIES OF THE ADVISORY BOARD

The Advisory Board shall meet at such times as the interests of the public service may demand. Meetings may be called by one or more members of the Board and three members shall constitute a quorum. Any action taken by the Board shall be reported to the Association through the President of the Association.

ARTICLE VI

DUTIES OF OFFICERS

The President

SECTION I. The President shall preside at all meetings, appoint all committees, unless otherwise provided for, approve all proper bills, and perform such other duties as are usually incumbent upon such an officer.

The Vice-Presidents

Sec. 2. The Vice-Presidents in order of seniority shall perform the duties of President in the absence or inability of that officer.

*The Secretary-***Treasurer**

Sec. 3. The Secretary-**Treasurer** shall keep the minutes of the meetings, the records and archives of the Association; receive all applications for membership and refer them to the Executive Council; [notify the Treasurer of the election of active and associate members;] issue certificates of membership to active, associate, and honorary members on election, and to life members [when advised by the Treasurer that the necessary fee has been paid]; and shall hold office until his tenure is terminated by resignation or death, or by the election of his successor after due and timely notice.

He shall be a member and ex-officio chairman of the Publication Committee.

He shall appoint an Assistant Secretary each year, and shall present an annual report.

He shall be editor of the official journal.

[*The Treasurer*]

[Sec. 4.] The **Secretary-**Treasurer shall receive all moneys due the Association, collect all assessments, and pay all bills which have been properly approved, except as provided in Article X.

The accounts of the **Secretary-**Treasurer shall be audited by a committee appointed for that purpose on or before the annual meeting, and at such other times as the Executive Council shall require. He shall present an annual report in which he shall state the number of members for each Service in the following classes: Life members; Active members in good standing; Active members delinquent, resigned, died, and dropped under Article IV, Sec. 2, of the By-Laws. Said report shall show all receipts, disbursements and outstanding debts of the Association.

Members in good standing shall be those who have paid all their annual dues at date of the last audit of the **Secretary-**Treasurer's account and none other shall be allowed to vote or be counted for votes in the annual or special meetings, except by authority of the Executive Council, in each case where dues have been paid after that date. Adopted, 1915 Annual Meeting.

He shall be custodian of the Sinking Fund.

He shall execute such bond as may be approved by the Executive Council for the faithful performance of his duties, the Association to bear the cost of this insurance.

Article VII

The Executive Council

Duties

Section 1. The Executive Council shall be charged with the conduct of the affairs of the Association during the intervals between the annual meetings, shall elect active and associate members, and perform such other duties as may be assigned to it by the Constitution and By-laws or by vote of the Association at any stated or special meeting. It shall temporarily fill all vacancies occurring among the officers of the Association between annual meetings.

Conduct of Business

Sec. 2. The business of the Executive Council may be conducted by correspondence or at such meetings as may be called by the chairman upon his own initiative or at the request of any three members. The Secretary-Treasurer shall keep a record of such correspondence and of the minutes of the meetings of the Council.

Officers

Sec. 3. The President and the Secretary-Treasurer of the Association, respectively, shall be ex-officio chairman and secretary of the Executive Council.

Quorum

Sec. 4. Five members of the Executive Council in meeting shall constitute a quorum for the transaction of business. In correspondence a majority of the whole Council shall govern.

Article VIII

Duties of Committees

Section 1. The Literary Committee shall outline the literary work for the annual meeting in advance, making the necessary arrangements for the reading and discussion of papers.

The Chairman shall be responsible for the program for the ensuing meeting.

The Committee shall assist the Publication Committee in the prompt publication of the Proceedings.

The Publication Committee

Sec. 2. The Publication Committee shall have charge of the publications of the Association.

It shall determine what portions of the proceedings are of sufficient general interest to be printed and decide upon the advisability of

publishing the several papers presented at the annual meetings, and such other matter as may be of value to the Association.

The Necrology Committee

Sec. 3. The Necrology Committee shall report to the Association, at each annual meeting, the deaths that have occurred during the preceding year among the members of the Association, with a suitable memoir in each case.

The Committee of Arrangements

Sec. 4. The Committee of Arrangements shall have charge of all local arrangements for the annual meetings of the Association.

The Nominating Committee

Sec. 5. The Nominating Committee shall, at the annual meeting, present a list of candidates for the various offices for the ensuing year.

The vote or votes of the Nominating Committee shall be cast by a member or members present from each State or Territory, the Army, the Navy, and the Public Health Service.

Article IX

DUTIES OF BOARDS OF AWARD

Boards of Award shall be charged with the selection of the person or persons to whom prizes shall be awarded, in accordance with the regulations of such prize competitions as may, from time to time, be instituted, and shall report the results thereof at such time as may be designated by the Association.

Article X

THE JOURNAL OF THE ASSOCIATION

The Association shall publish a monthly journal to be known as The Military Surgeon, in which shall be printed the proceedings of the annual meeting and such other matter as is determined upon by proper authorities. The cost of the journal shall be paid by an allotment of Association funds to be made on a budget submitted by the Editor and approved by the Executive Council.

The Secretary-**Treasurer** shall be ex-officio Editor of the journal and may appoint, with the approval of the Executive Council, such associate Editors and Collaborators as he finds necessary or desirable in conducting its publication.

He shall receive such monies accruing from subscribers, advertisers, and other sources pertaining to the journal as are sent to him, shall keep a business record of the same and deposit the money in a bank approved by the Executive Council, in the name of The Association of Military Surgeons of the United States, subject to his order.

He shall pay such bills as are due in connection with the journal, which have been approved by the President, or an officer of the Association designated by him, [and shall render a monthly account through the President to the Treasurer with his check for any unexpended balance remaining to his account at the end of each month.]

[The Editor shall be bonded in amount determined by the Executive Council and shall submit a report at the annual meeting of the Association, with a statement of his account duly audited by a certified accountant, to be designated by the Executive Council, and such other reports as may be called for by the Council.]

Article XI

AMENDMENTS

All proposed amendments to these by-laws must be forwarded to the Secretary-**Treasurer,** who will present them to the Executive Council at least three months before the next annual meeting. The proposed amendments and views of the Council shall be published in the journal of the Association not later than one month before the annual meeting, at which meeting they may be adopted by a three-fourths vote of all the members present.

Article XII

ORDER OF BUSINESS

1. Reading of records of previous meeting.
2. Appointment of Committees.
3. Report of Executive Council.
4. Report of Secretary-**Treasurer.**
[5. Report of Treasurer.]
5. Report of Editor.
6. Report of Standing Committees.
7. Report of Special Committees.
8. Unfinished Business.
9. New Business.
10. Literary and Social Program.
11. Election of Officers.
12. Installation of New Officers.
13. Reports of Committees.
14. Incidental Business.
15. Adjournment.

The parliamentary rules governing in the Congress of the United States shall be the standard of this Association.

COMMENT AND CRITICISM

CHICAGO, ILL., *July* 10, 1919.

I wish to emphasize the work of the medical profession during the late war. We cannot overestimate its value.

Through the work of modern medicine it was made possible to maintain enormous armies in excellent physical conditions under surroundings which, until recently, would have meant an enormous percentage of disability—such a percentage as would have largely neutralized the fighting value of the troops. Modern surgery has also accomplished marvels in the saving of life and limb, and in the prompt restoration of men to duty.

Never before have the results of preventative medicine and surgery stood out as they have in this war nor have they played so important a part. The great problem in modern war is the placing in the field of an army fit to fight, and maintaining it there in condition to render the best service—for this result the work of the Medical Department has been largely responsible. It has been a great work.

The losses among medical officers have been very heavy. I was told, on the British front in 1918, that the percentage of losses among the medical officers of the British Army (many of whom were from our own country) had been exceeded only by the losses in the infantry.

The work of the Medical Department in this war should lead to the fullest recognition of its importance.

Very sincerely yours,

LEONARD WOOD.

FIRST IMPRESSIONS

It may seem presumptuous for me, at home only two weeks after nearly two years of foreign service, to comment on conditions that are still novel and strange. But, if there is any lesson that one learns in the Army, it is to readjust oneself quickly and easily to sudden transitions and new environment. Home-coming is none the less a severe test.

The man in uniform is soon made aware of the fact that he is no longer a hero; in fact, the well-groomed business man in cits seems to look askance at himself as if he were annoyed at being reminded of the fact that there was, long ago, a war which cost a good deal of money and incidentally 300,000 casualties. Never having been ashamed of that uniform, and not sharing in the prevailing desire to shed it as soon as possible, I have felt equally annoyed.

The minor changes—the fact that there seems to be no vacancy

crying out for the returning medical officer and that the dollar now literally "looks like thirty cents"—were naturally to be expected. It has been too much the fashion among those who had the great privilege of being overseas to speak somewhat slightingly, if not in a patronizing way, of those who were equally patriotic but less fortunate, and who wear a different service stripe from ours. I had not been twenty-four hours in camp here before I was ready to admit that "all is not gold that glitters." The cheerful performance of hard and irksome duty, for efficiency, for self-sacrifice, I take off my hat to the medical officers who from start to finish have been "on the job" at home.

Their hardest work began when ours ceased—after the armistice—and their record speaks for itself. Personally I am proud to exchange my foreign insignia for the "P. E." which marks the wearer as a mem ber of an honorable guild.

Among the numerous citations, decorations, and other externals, where is the recognition of these worthy officers?

H. C. Coe.

INCONTINENCE OF URINE

About forty cases, sent with the diagnosis "Incontinence of Urine," were treated in the base hospital. These patients were divided as soon as possible into three classes: (1) True enuresis infantilis; (2) incontinence brought on by the unusual military surroundings, the shock from being taken from civil life, and hysteria; (3) the malingerers.

It was rather difficult to place each patient in his correct class. In some cases belonging to the first class we had affidavits from family physicians or near relatives telling us that the incontinence had been present from the patient's infancy. We also had reports from regimental surgeons stating that the patient was a regular bedwetter. Some of these patients were degenerates with a low mental development. The cystoscopic examination showed in more than half of these cases a trabeculated bladder with a slight diverticulum upwards. These symptoms, with the exception of a single case, were not found in any of the other classes.

In the second class we had some cases of incontinence where seemingly strong and healthy soldiers suddenly complained to their regimental surgeons that they were wetting their beds, especially after hard exercise with profuse perspiration followed by a sudden cooling off. Hypersensibility of the bladder wall, caused by reflex action from cooling of the skin of the lower abdomen, may develop a condition in the bladder that causes it to contract with only a small amount of fluid. In a few cases the cause could be traced to the strict military discipline, the

unusual strain, mental and physical, under which many of these newly enlisted men worked trying to perform their unaccustomed duties as well as possible. Some of these cases started with poluria, which in a short time turned into incontinence. The cystoscopic examination was usually negative.

Certain infectious diseases may cause incontinence. Dysentery was thought to have caused it in two of the patients.

The last class of patients belonged to the third category, the malingerers. There is nothing to be said about them.

The treatment of the first class, true enuresis, did not give any result. The condition is nearly always hopeless.

In the second class good results were obtained by keeping the patient in bed with hot poultices on the abdomen and warm bladder irrigations. The medicinal treatment was atropin. The bromides and opiates did not give any result. The prognosis is usually good exept in cases of long standing where the bladder wall and sphincter have become loose and inactive.

The last class was treated in a different but successful way. When we were certain that the patient was a malingerer he was put on a restricted diet with magnesium sulphate every morning; a large sound was passed and he was turned out of bed every hour during the night and forced to go to the bathroom. Twenty-four to thirty-six hours were usually enough to cause him to make up his mind that he was cured, and he was sent back to his regiment where a recurrence of his trouble was very seldom noted.

If no improvement were noted in the cases of the two first classes after a certain stay in the hospital, they were recommended for discharge.

MAJOR EJNAR HANSEN, M. C.,
Chief of Urological Section,
Camp McArthur, Waco, Tex.

RE-ENLISTMENT

The statement below should be of much interest to former enlisted men of the regular service, now commissioned officers, who will soon be discharged.

Former noncommissioned officers of the regular service now holding temporary commissions which will soon be terminated, as well as those who have already been discharged as officers, may be re-enlisted in the grade from which they were discharged, for the purpose of accepting a commission, and placed on recruiting duty in New York, under authority granted by the War Department, to Col. Wilber E. Wilder, Cavalry, 461 Eighth Ave., New York City, in charge of the New York District.

MILITARY HISTORY PRIZE

The following is published for the information of any of our readers who may be interested:

The American Historical Association offers a prize of $250 for the best unpublished essay in American military history submitted to the Military History Prize Committee before July 1, 1920.

The essay may treat of any event of American military history—a war, a campaign, a battle; the influence of a diplomatic or political situation upon military operations; an arm of the service; the fortunes of a particular command; a method of warfare historically treated; the career of a distinguished soldier. It should not be highly technical in character, for the object of the contest is to extend the interest in American military history; but it must be a positive contribution to historical knowledge and the fruit of original research.

The essay is not expected to be less than ten thousand or more than one hundred thousand words in length.

It should be submitted in typewritten form, unsigned; and should be accompanied by a sealed envelope marked with its title and containing the name and address of the author, and a short biographical sketch.

Maps, diagrams or other illustrative materials accompanying a manuscript should bear the title of the essay.

The committee, in reaching a decision, will consider not only research, accuracy and originality, but also clearness of expression and literary form. It reserves the right to withhold the award if no essay is submitted attaining the required degree of excellence.

For further information address the chairman of the Military History Prize Committee, Milledge L. Bonham, Jr., Louisiana State University, Baton Rouge, Louisiana.

Milledge L. Bonham, Jr., *Chairman*,
D. R. Anderson,
Allen R. Boyd,
Albert Bushnell Hart,
Fred M. Fling,
Military History Prize Committee.

BOOK REVIEWS

THE BLIND: THEIR CONDITION AND THE WORK BEING DONE FOR THEM IN THE UNITED STATES, by Harry Best, Ph.D.; author of "The Deaf: Their Position in Society and the Provision for their Education in the United States." New York: The Macmillan Company, 1919.

In the opinion of their viewer Dr. Best has succeeded in producing a thorough and comprehencesive treatise on an important but heretofore neglected division of sociologic medicine. We have many books dealing with the blind and their care but they are largely of a sentimental nature. The work under review is an examination of the blind and their estate from the point of view of the social economist, a social survey of this unfortunate component of the population. While the book is primarily a scientific inquiry, it contains an abundance of human interest, and it will be valuable alike to the physician, lawyer, legislator, economist, sociologist and philanthropist.

The subject is presented in seven parts as follows: I. General Condition of the Blind; II. Blindness and the Possibilities of its Prevention; III. Provision for the Education of Blind Children; IV. Intellectual Provision for the Adult Blind; V. Material Provision for the Blind; VI. Organizations Interested in the Blind; VII. Conclusions with Respect to the Blind.

The text is clear and logical, the references abundant, and the typographical work satisfactory.

FRANCIS M. MUNSON.

ELECTRICITY IN MEDICINE—A Practical Exposition of the Methods and Use of Electricity in the Treatment of Disease, Comprising Electrophysics, Apparatus, Electrophysiology and Electropathology, Electrodiagnosis and Electroprognosis, General Electrotherapeutics and Special Electrotherapeutics, by George W. Jacoby, M.D., Former President of the New York Neurological Society and of the American Neurological Association; Consulting Neurologist to the Lenox Hill Hospital, etc., etc.; and J. Ralph Jacoby, A.B., M.D., Fellow of the New York Academy of Medicine, Member of the American Medical and the American Medico-Psychological Associations; Chief of Clinic, Neurological Department, Lenox Hill Hospital, etc., etc. With 262 illustrations. Philadelphia: P. Blakiston's Son & Co. Price, $5.

The authors have produced an eminently practical and useful book which will be a valuable addition to the library of every physician who desires to utilize electricity as a remedial agent. It is divided into six parts as follows: I. Electrophysics; II. Apparatus Required for the Therapeutic and Diagnostic Use of Electricity; III. Electrophysiology and Electropathology; IV. Electrodiagnosis and Electroprognosis; V. General Electrotherapeutics; VI. Special Electrotherapeutics.

The work is confined rather closely to electricity in medicine in contradistinction to surgery. For this reason nearly all surgical references have been excluded, and the subjects of X-rays and phototherapy have not been deeply considered.

The illustrations are all that could be desired, the text is clear, and the typographical work of a high order.

FRANCIS M. MUNSON.

A Text-Book of Practical Therapeutics—With special reference to the application of remedial measures to disease and their employment on a rational basis, by Hobart Amory Hare, M.D., B.Sc., Professor of Therapeutics, Mater Medica, and Diagnosis in the Jefferson Medical College of Philadelphia; Physician to the Jefferson Medical College Hospital; One-time Clinical Professor of Diseases of Children in the University of Pennsylvania; Surgeon, U. S. N. R. F. Seventeenth edition, enlarged, thoroughly revised, and largely rewritten. Illustrated with 145 engravings and 6 plates. Philadelphia and New York: Lea and Febiger.

The medical profession gladly welcomes the new edition of Dr. Hare's book that has been so well and favorably known during the past thirty yers. The present edition has required so many alterations and additions that a large part of it has been reset in new type. Among other additions and changes are noted the following: Greater consideration of the technique of intravenous injection and direct transfusion is given than before. The use of Dakin's fluid and dichloramine-T by Carrel's method and the treatment of burns by parafine are discussed for the first time. The methods of prescribing a proper diet for the sick are described more in detail than formerly, particularly in respect to children and diabetics. Many important drugs heretofore made in Germany, or under German patents, are now made in this country and have been given names whereby they may be properly designated, as, for example, arsphenamine for salvarsan, and procaine for novocaine, and these changes have been included in the new edition.

Francis M. Munson.

Hygiene and Public Health, by George M. Price, M.D.; author of "A Handbook of Sanitation," "Tenement House Inspection," "Hygiene and Sanitation for Nurses," "The Modern Factory," Director, Joint Board of Sanitary Control. Second edition, thoroughly revised. Philadelphia and New York: Lea and Febiger, 1919. Price, $1.50.

In the second edition of his useful little epitome Dr. Price has given the essential parts of the science of hygiene and has very wisely not attempted to cover the whole field. He has brought the text up to date, the most important changes being in the chapter on Prevention of Infectious Diseases. By the use of bold-faced type heading the sections, subsections and paragraphs, the author has made any desired subject easy to find. A brief work but of high character.

Francis M. Munson.

A Treatise on Orthopedic Surgery, by Royal Whitman. M.D., M.R.C.S., Eng., F.A.C.S., Director of Military Orthopedic teaching; Chairman of the Medical Advisory Board for Orthopedics in New York City; Associate Surgeon to the Hospital of St. John's Guild; Consulting Surgeon to St. Agnes' Hospital for Crippled and Atypical Children, White Plains, to the New York State Board of Health; Member of the American Orthopedic Association; Corresponding Member of the British Orthopedic Society; Member of the New York Surgical Society, etc. Sixth edition, thoroughly revised; illustrated with 767 engravings. Philadelphia and New York: Lea and Febiger, 1919. Price, $7, net.

Whitman's Orthopedic Surgery is probably the most deservedly popular single-volume treatise on orthopedic surgery which has appeared in the English language. That it has been found necessary to issue a new edition within two years of the last is evidence of the progressive spirit of the publication.

Few changes are noticed in the main text of the book from the last (fifth) edition. There has been added, however, an interesting and valuable chapter of fifty-four pages on Military Orthopedic Surgery.

First, the types of cases officially belonging to the orthopedic department of military surgery are described, such as ununited and mal-united fractures, disability of the joints, injuries of the muscles, ligaments and tendons, deformities of the feet, etc. The author makes a statement, quoting Starr, that it has been estimated that 20 per cent of all casualties are of an orthopedic nature; that 70 per cent of returned surgical cases are of this class, and that in 20 per cent of these, operations are required.

Variations from the normal and diseased conditions which would reject an applicant for registration are given in discussing the spine, the sacro-iliac and lumbosacral joints, scapulae and extremities.

The subject of fractures is then taken up; apparatus suitable for the different types is illustrated and described; also the operative repair of fractures, including the use of bone grafts.

There is a valuable description of the preparation of stumps for artificial limbs; also an illustrated description of Vanghetti's kineplastic amputations. A brief, up-to-date discussion of injuries to the nerves and their treatment operative and mechanical, will be found interesting and instructive. The best routes of approach to the different nerves of the extremities are described and well illustrated by excellent cuts borrowed from Gerish's Anatomy. Whitman also uses cuts from the same book to illustrate his tendon transplantation for paralysis of the median nerve.

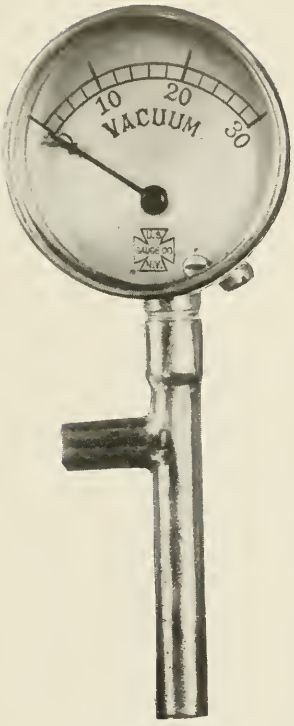
As to "Attitudes of Election," Whitman says: "Deformity is an almost inevitable result of the more severe types of disease that directly or indirectly involve the locomotor apparatus, the more constant factors in its causation being the force of gravity, muscular contraction and the postures assumed in accommodation to weakness and discomfort.

"There is a standard position for each joint which best adapts the limb for functional usefulness when motion is lost or seriously impaired. This attitude should be assured as long as the tendency to deformity persists, and it should be restored as soon as possible if it has been lost."

Different suspension frames and traction splints are illustrated, and numerous other forms of apparatus are pictured, including the Schede splint for the after treatment of injuries in the neighborhood of joints, which is taken from Mayer's book on the Orthopedic Treatment of Gun-Shot Injuries, recently reviewed in these pages. Other forms of apparatus recommended are of the Thomas-Jones type.

Several pages are devoted to reconstructive treatment, using the term in the sense of the final adaptation of the disabled member to the functions for which it may be capable.

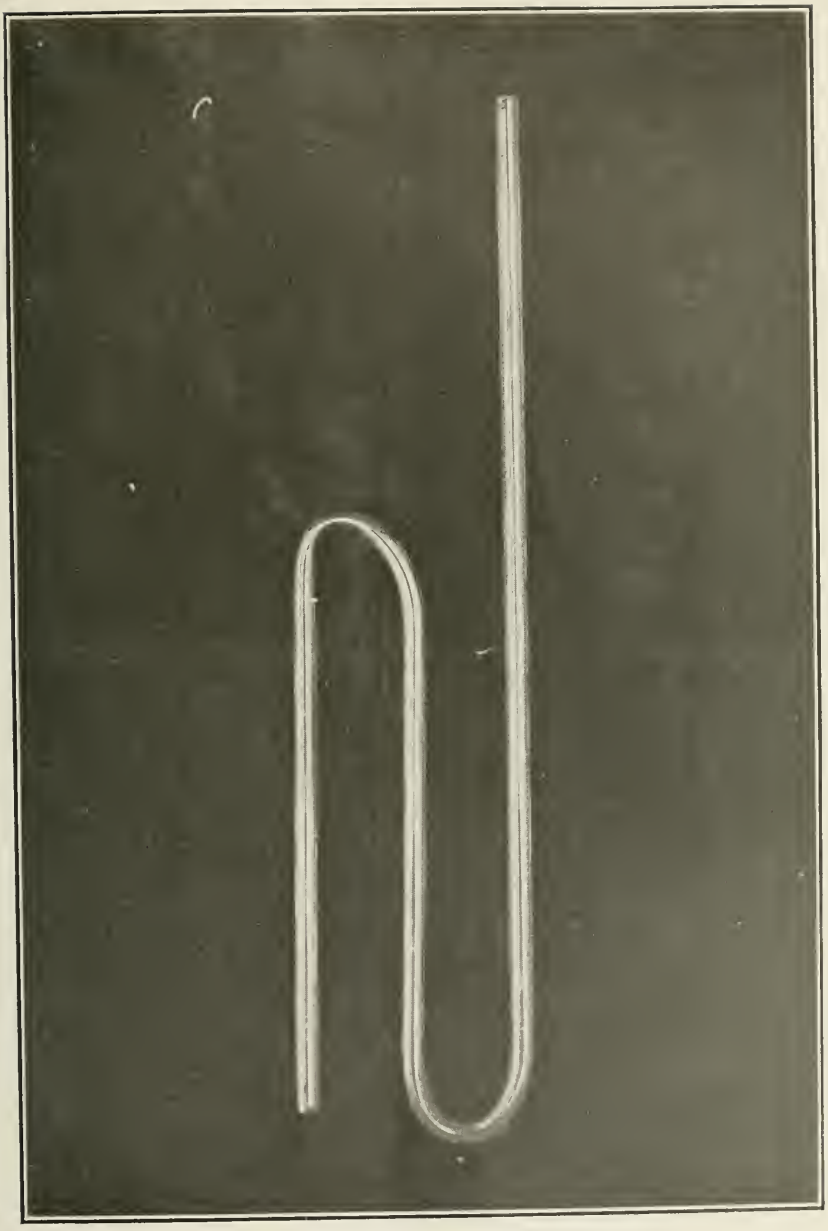
Jno. E. Summers.



Vacuum Gauge

(To face page 363.)

Negative Pressure Irrigation Assembly



Millimeter Tube for Column of Mercury

INSTRUMENTS AND APPLIANCES

AN APPARATUS FOR THE CARREL-DAKIN NEGATIVE PRESSURE TREATMENT OF EMPYEMA

By Major JOHN E. CANNADAY, M. C.
Chief of Surgical Service, Base Hospital, Camp Sherman

(With three illustrations)

The combination of Carrel-Dakin irrigation with negative pressure, as described by Deiderich,[1] Moschowitz[2] and Mozingo,[3] has been so highly satisfactory in the treatment of empyema that many surgeons will be interested in some assembly of apparatus that is easy to handle and positive in action. The following described apparatus has been personally tried out in the U. S. Army hospitals at Fort Sheridan and Camp Sherman and has been found to be exceedingly satisfactory and easy of control. It consists mainly of a large carboy in which a vacuum has been made by the use of the ordinary filter pump such as is used in most laboratories (this is connected by rubber tubing equipped with Mohr pinch cocks and is in turn connected with a smaller vacuum bottle intended for the collection of the pus drainage and washings of the empyema cavity), several straight glass connections, also a glass Y-tube connecting both with the Carrel-Dakin irrigator and the drainage bottle. Two patients can easily be connected up with the same irrigator. If desired, the amount of vacuum can easily be regulated by the use of a millimeter column of mercury or by the ordinary standard vacuum gauge, which may be connected with one or both of the vacuum bottles. Ordinarily the large carboy is used as a reservoir from which to replenish and regulate the vacuum in the collecting bottle. In event of a filter pump not being available, the vacuum can be maintained by the use of a syringe, although the latter method entails the expenditure of a considerable amount of labor.

We have generally used the apparatus in the following manner. As soon as it has been definitely established that the empyema cavity contains pus, a 16 French soft rubber catheter is inserted into the cavity by the use of the Deiderich trocar. The catheter is connected with the vacuum bottle and the pus drawn off gradually so as to minimize the disturbance of the lung. Normal saline solution is slowly introduced and the symptoms of bronchial fistula are watched for; in case none are noted, the cavity is irrigated until the solution returns clear. Carrel-

[1] Deiderich, Victor P: Surgery, Gynecology and Obstetrics, vol. 28, p. 362.
[2] Moschowitz, Alexis V.: Surgery, Gynecology and Obstetrics, vol. 28, p. 337.
[3] Mozingo, Arvine E: Jour. A. M. A., vol. 71, p. 2062.

Dakin irrigations are then begun and continued at sufficiently frequent intervals to eliminate the infection and toxemia incident to pus in the pleura cavity. This often requires irrigations every hour or every two hours during the day, and every two hours at night. Ordinarily enough solution is allowed to flow into the empyema cavity to nearly fill it, and the fluid is allowed to remain from five to ten minutes. During this time the patient's shoulders are lowered, and he is encouraged to turn from side to side in order that all parts of the cavity may come in contact with the fluid. The solution is then withdrawn. During the intervals between the irrigations a moderate vacuum is usually maintained on the tube in the chest, the degree of vacuum being regulated so as not to cause discomfort to the patient (the degree of vacuum will have to be varied according to the individual). The maintenance of a more or less constant negative pressure gives the patient material assistance in the expansion of the lung. Meltzer[4] suggests that in the average case a negative pressure sufficient to lift 5 or 6 mm. of mercury will give a proper amount of pull on the lung. The size of the empyema cavity should be frequently checked by the use of the fluoroscope and by X-ray negatives. Air does not usually begin to leak around the catheter for from twelve days to two weeks, and the leaks can be easily controlled by the use of adhesive plaster. When smears and cultures from the cavity have been reported negative for five or six days in succession, the catheter is usually removed from the cavity; in case the cavity is large, the catheter may later have to be reinserted through the original opening in order to bring a renewed infection under control The smaller cavities often close, remain sterile and even disappear in a relatively short time, while rib resection may ultimately have to be resorted to in the case of some of the larger cavities.

[4] Meltzer, Simon J.: Personal communication.

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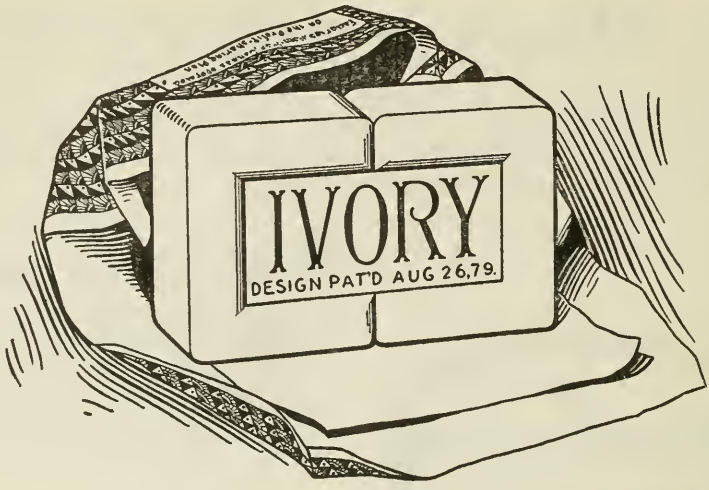

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REMEMBER!

The Annual Meeting of the Association of Military Surgeons will be held in St. Louis, Missouri, with headquarters at the Hotel Statler, from October 13th to 15th, 1919. This is the first meeting after the close of the war, and for that reason should be of particular interest to all members of The Association. Why not make it a point to attend, and, if possible, to bring someone with you who may be interested in joining The Association.

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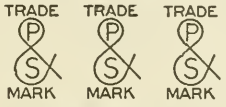

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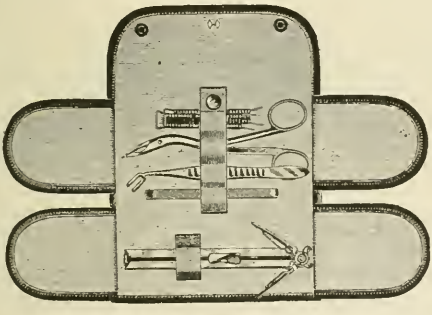

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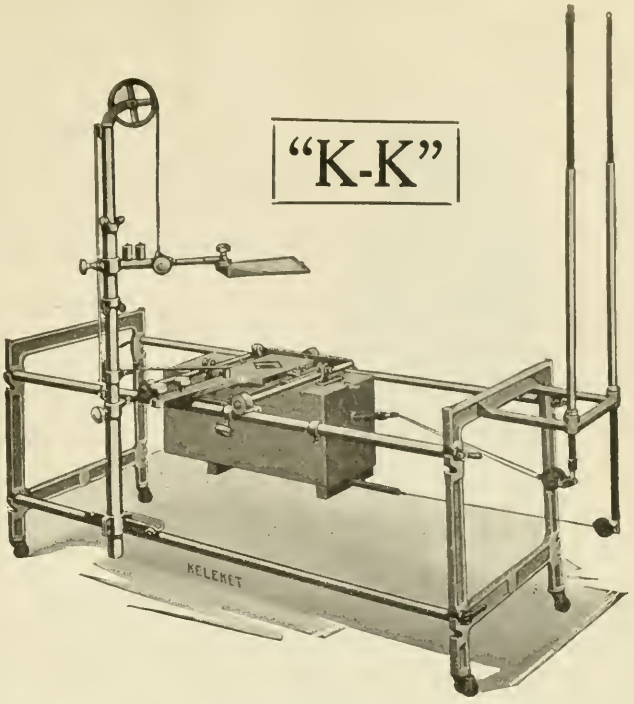

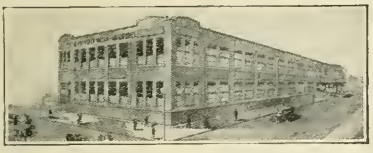

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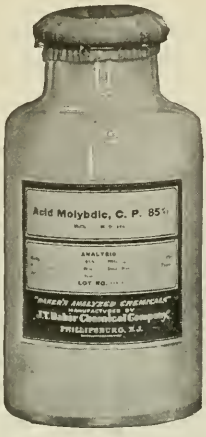

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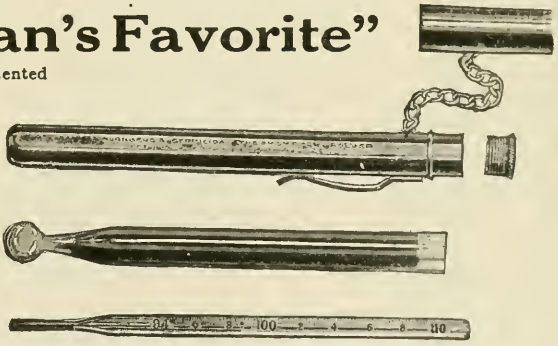

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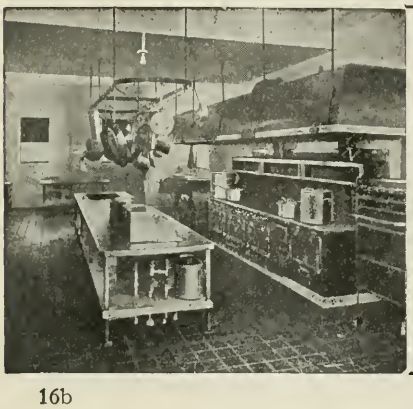

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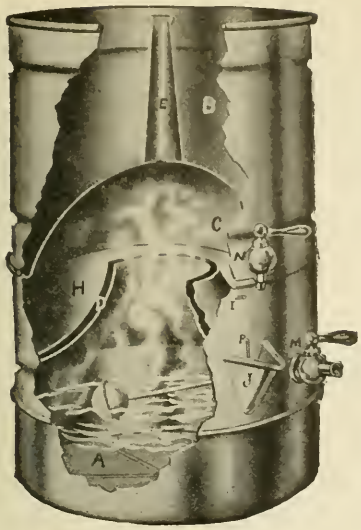

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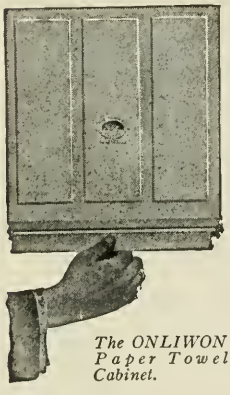

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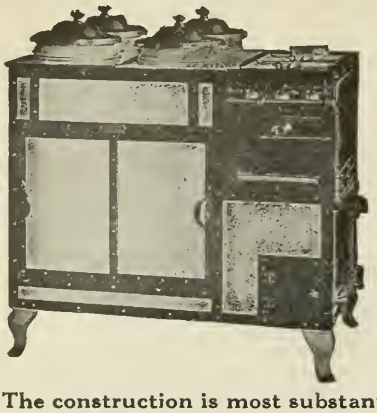

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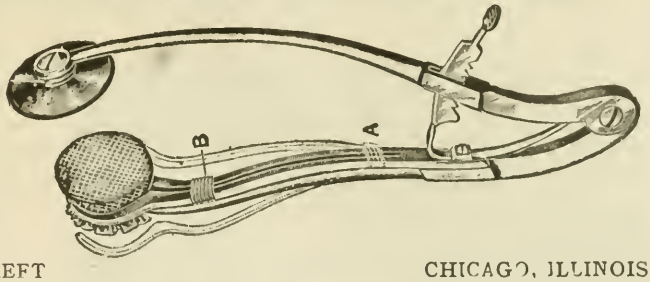

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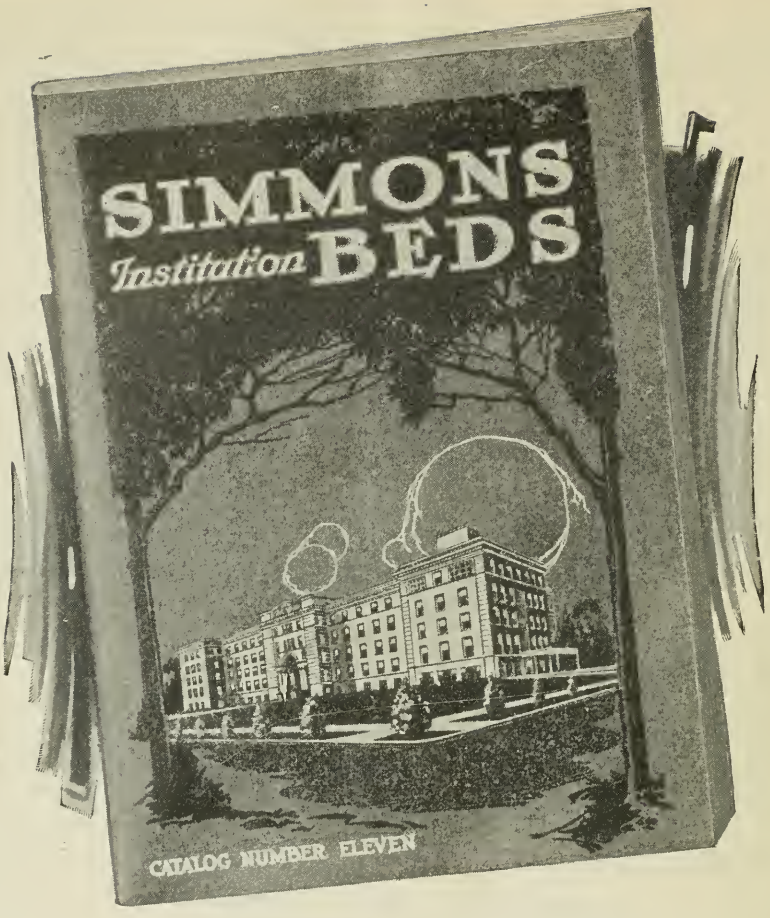

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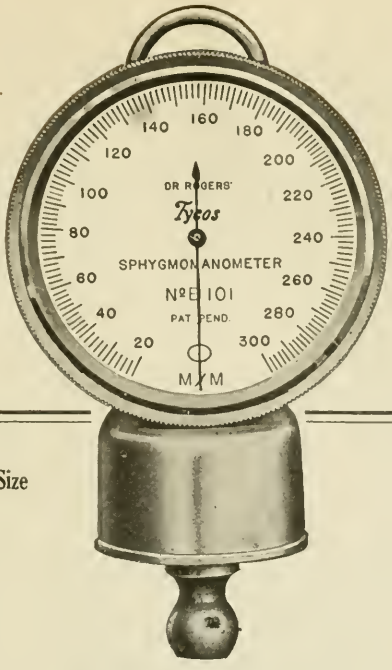

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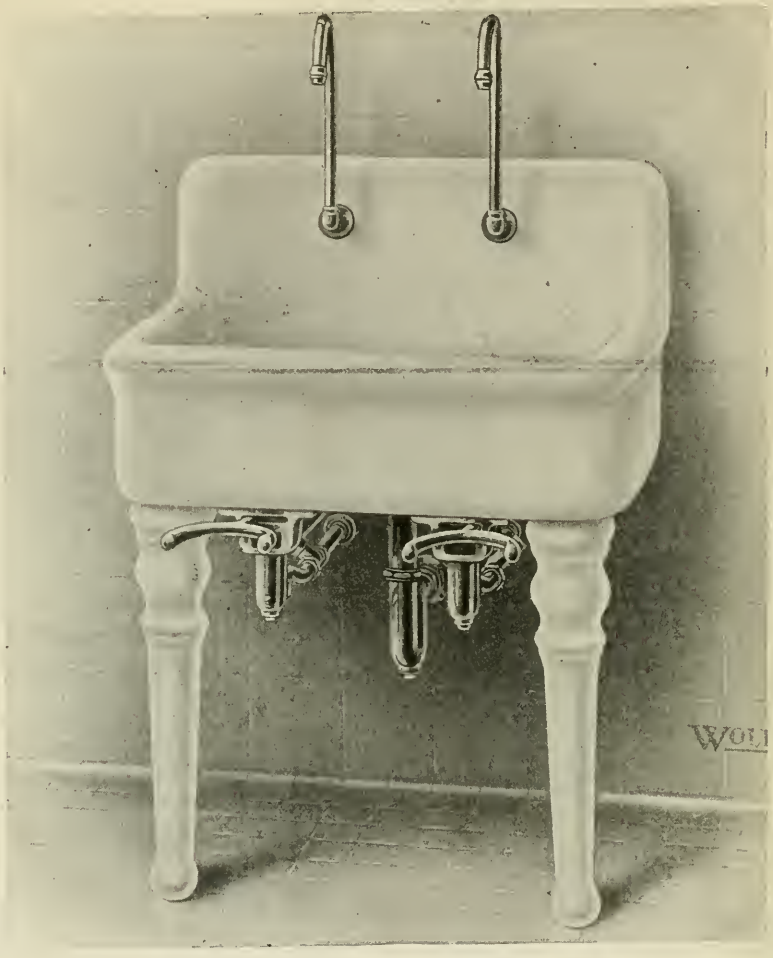

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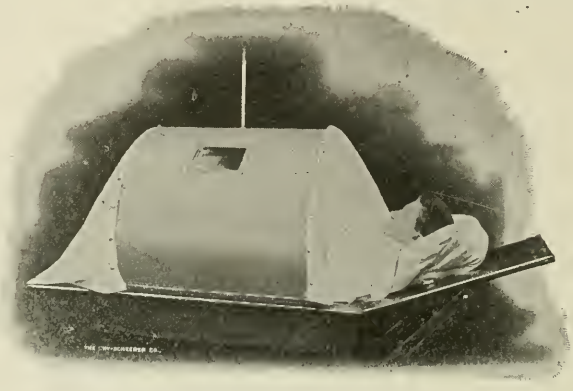

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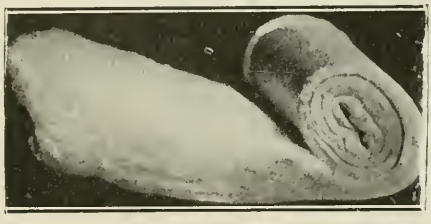

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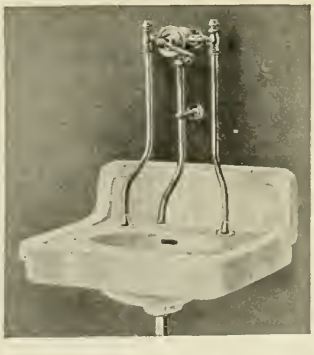

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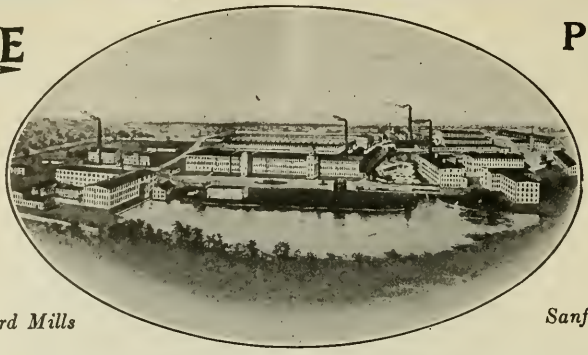

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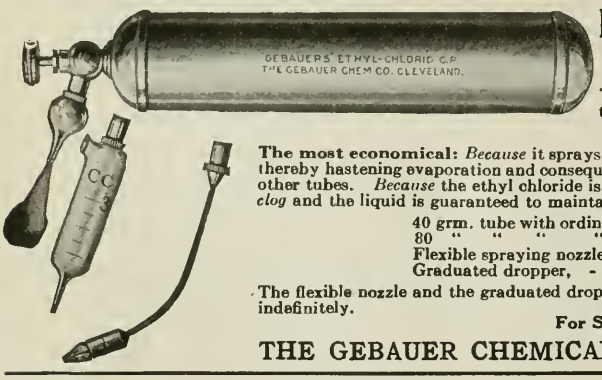

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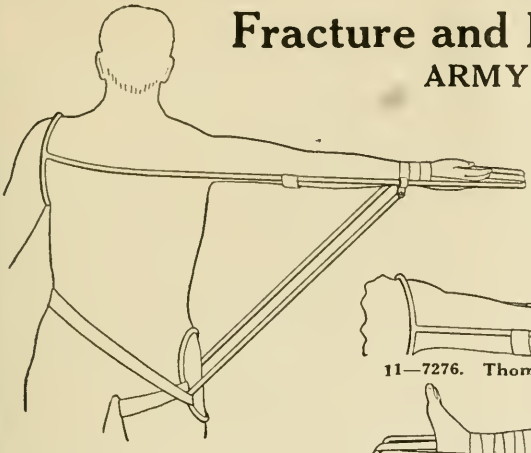

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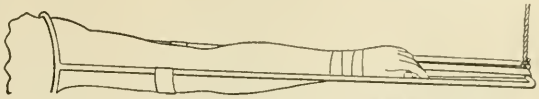

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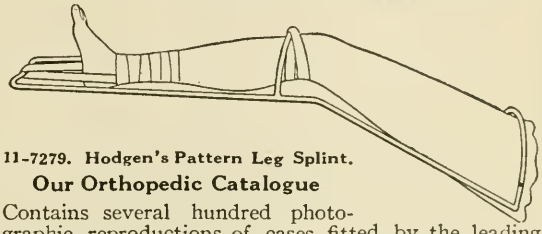

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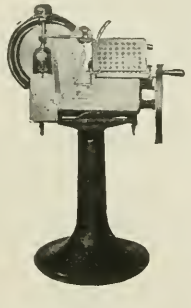

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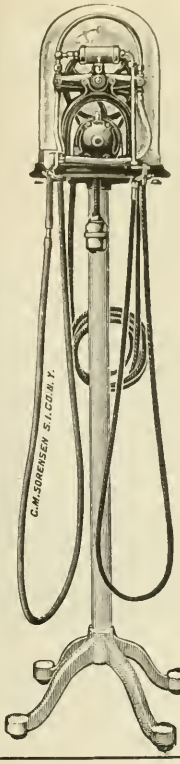

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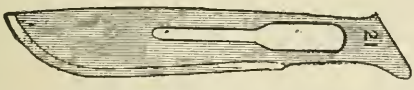

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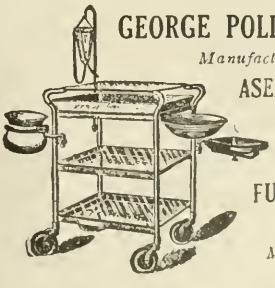

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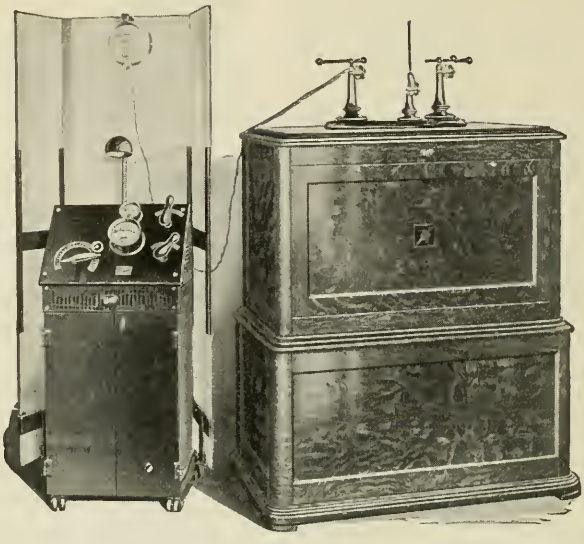

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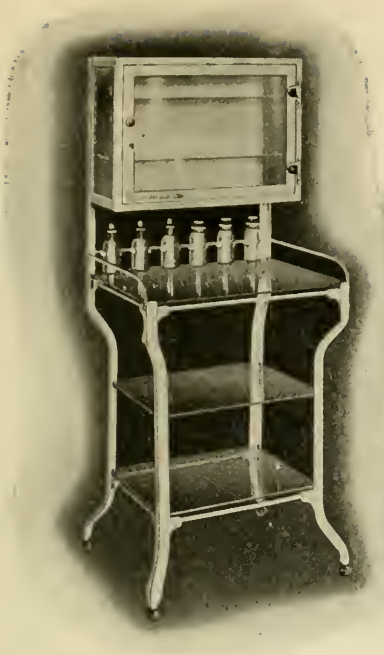

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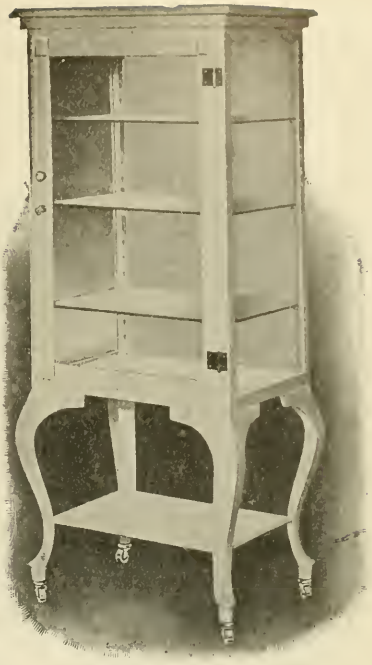

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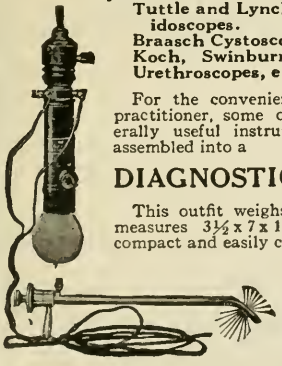

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